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Remediation Strategy

Residential Development

Bepton Road, Midhurst

October 2023

Residential Development

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Revision	Date	Description	Author	Reviewer
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Table of Contents

Drawing Register

Title	Produced by	Date	Reference
Topographic Survey	D & H Surveys	December 2018	Not referenced.
Proposed Layout (planning layout)	jtp	01/08/2022	01486_MP_01 Rev P6
Illustrative Site Plan	jtp	01/08/2022	01486_MP_02 Rev P6
Demolition Plan	jtp	25/06/2021	01486_S_02 Rev P2
Midhurst Isopachyte	ERGO	07/03/2023	23-1518-002
Midhurst Volumetrics	ERGO	07/03/2023	23-1518-001

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Non-technical Summary

Task No.	Remediation Task
Pre-Commencement	
PC1 – Gas Design Report	A Gas Design Report must be completed pre-construction to provide the specification of materials and the construction details for the gas protection measures required, along with the provision of a verification strategy.
Demolition / Enabling Works Phase	
EW1 – Materials Management Plan	To facilitate the reuse of Made Ground and site won materials on site, together with import of clean naturally occurring soils from donor sites an MMP is required. This item is not required as part of the formal Remediation Strategy or planning conditions.
EW2 – Discovery Strategy	Notify Soiltechnics upon encountering any unexpected contamination.
EW3 – Tank removal	Removal of all tanks and interceptors, associated pipework and grossly contaminated ground, under the watching brief of the Consultant.
EW4 – Hotspot removal	Delineation and removal of two known contaminant hotspots, under the watching brief of the Consultant. Includes one known area containing cemented ACMs (TP06), and another containing elevated PAHs within the Made Ground (TP08).
Construction Works Phase	
CW1 – Barrier pipe	Installation of protective barrier drinking water pipe.
CW2 – Gas protection measures	Installation and verification of ground gas protection measures (CS-2 and CS-3).
CW3 – Clean cover system	Installation of an engineered clean soil cover system in the northern areas of the site.
CW4 – Suitable soils	Ensure provision of a suitable growing medium in the southern area of the site.
All Work Phases	
AW1 – Material management	Maintain records for all soils and liquids imported, exported, and disposed of.
AW3 – Material verification	Ensure chemical and geotechnical verification is carried out on all imported soil and fill materials.
AW4 – 3rd party verification	The Consultant must provide an intermittent watching brief, site inspections, and conduct sampling and investigation to verify all remedial tasks outline above. A Verification Report must be produced upon completion.

1 Introduction

1.1 Scheme Outline

1.1.1 The Site is located to the north of Bepton Road, Midhurst, West Sussex. GU29 9QX.

1.1.2 It is understood the scheme will comprise the demolition of existing buildings and structures, followed by the redevelopment of the site for a residential development, with associated private gardens, access roads and areas of public open space.

1.1.3 It is understood that the development is controlled by South Downs National Park Authority under application reference SDNP/21/03448/FUL. The existing and proposed site plans are presented in Appendix A, and a site zoning plan is provided below.

1.1.4 The report is based on the project proposals and information outlined above; should the scheme change then it will be necessary to review the report.

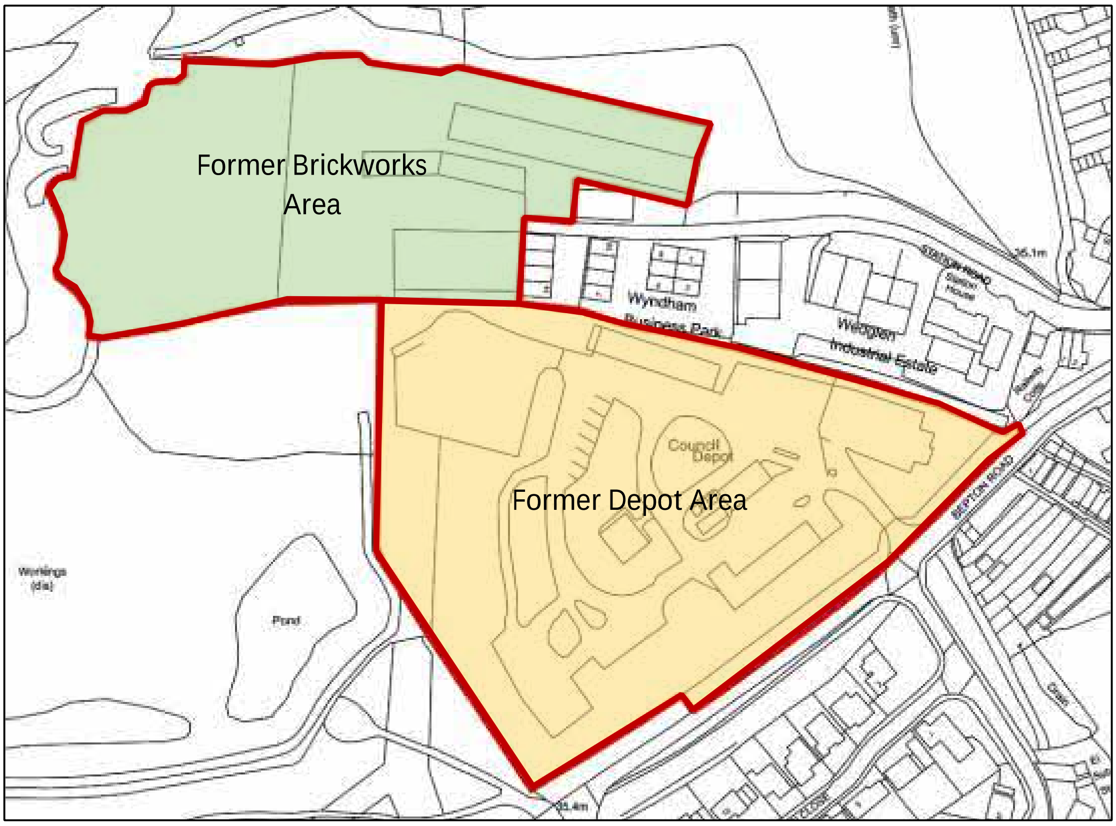

Figure 1: Site Zoning Plan

1.2 Site Setting

1.2.1 The site is located in the northwest of Midhurst within an industrial area comprising a former brickworks and council depot site. Business Parks are present to the immediate northeast and residential development is present to the southeast. A surface water pond is present beyond the southwestern boundary. Woodland is present to the north and west.

1.2.2 Currently, the site is occupied by office buildings in the former depot area of the site (the southeastern part of the site) and the northeastern part of the site has been used for temporary storage of fencing and other goods associated with the depot. Underground fuel Storage Tanks are known to be present at the site entrance at the northeastern extent and a barn is present at the northern boundary housing a salt heap and tarmacadam loading area.

1.2.3 The former brickworks area is accessed off Station Road to the northeast and has recently been used as a soil and waste sorting area (associated with the Council Depot). Several stockpiles of waste materials are present which visually include soils and building rubble, held under barn style buildings which comprised the former brickworks sheds. A further barn is present in the southern extent, which houses dismantled vehicles and heavy plant.

1.3 Brief

1.3.1 This report has been prepared following instructions received from Bellway Homes Limited (South London). This report provides the Remediation Strategy to support the proposed development.

1.3.2 The objective of the remediation strategy is to address the remedial recommendations, data gaps and requirements for further works outlined within the previous ground investigation report (GIR) undertaken by Geo-environmental Ltd, referenced GE18721-GARv6.0 dated February 2023.

1.3.3 This report is carried out to satisfy planning Condition 16 (Remediation Strategy) and 18 (Discovery Strategy) of the planning permission SDNP/21/03448/FUL. Condition 17 relates to the verification of all remedial works and can is to be addressed in a Verification Report towards the end of the construction phase, once all remedial works have been completed.

1.3.4 The Remediation Strategy will be carried out following the principles of BS10175: 2011+A2:2017 ‘Investigation of potentially contaminated sites – Code of Practice’ and the Environment Agency’s Land Contamination Risk Management guidance.

1.4 Aims and Objectives

1.4.1 The principal aim of this report is to satisfy the brief outlined above and thereby provide information to facilitate the safe development of the project. The objectives of this report are outlined below:

i. Confirm if sufficient information is available to inform the remediation.
ii. State the relevant pollutant linkages which require remediation.
iii. Identify a feasible remediation option to break the pollutant linkages.
iv. Set remediation objectives and criteria.
v. Outline how the remediation will be implemented.
vi. Identify any monitoring and maintenance requirements.
vii. Establish a verification plan.
viii. Recommend any further works.

1.5 Limitations

1.5.1 Soiltechnics disclaims any responsibility to our Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence in accordance with the terms of our contract, taking account of the resources devoted to it by agreement with our Client. This report is confidential to our Client and Soiltechnics accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

2 Site Conditions and Identified Contamination

2.1 Sources of information

2.1.1 Reference has been made to the following sources of information.

Author	Document Title	Date & Document Reference	Report Context
Geo-environmental Ltd.	Ground Investigation Report	GE18721-GARv6.0 February 2023	Main GI Phase to support the development and conduct the appropriate risk assessment.

Table 1: Summary of previous reports

The Ground Investigation makes reference to an earlier Phase I Desk Study (GE17163-DSR-JUN18) and indicates that the site was historically open land which became developed for the brickworks, a railway line, sidings and a council yard which included Underground fuel Storage Tanks (USTs). Landfill sites were historically present which may potentially have encroached onto the site.

2.2 Ground Conditions

2.2.1 The ground conditions encountered during the previous investigations are summarised in the table below.

Strata	Summary	Depth to Base
Topsoil	Dark brown slightly clayey fine sand with frequent roots and rootlets	0.2 (TP203 only)
Made Ground	Hardstanding (tarmacadam/ concrete in depot area only) over clayey sand with gravel of concrete and tarmacadam or sandy clay with gravel of brick, concrete, coal, wood, tarmacadam, rope, wire, chalk. Hydrocarbon odours in TP201 (0.45 and 1.10mbgl, TP01 (0.05-1.60mbgl), TP02 (0.3-0.9mbgl) and TP03 (0.15-1.30mbgl), in vicinity of USTs.	2.80
Folkstone Formation	Slightly clayey fine to medium/ medium to coarse sand occasionally gravelly and with bands of firm to stiff laminated clay	>9.53

Table 2: Geological profile summary

2.2.2 Stockpiled materials were present in the northwestern part of the site. However, the majority of these were removed leaving a single stockpile (identified as Stockpile 3, total volume of 160m^3). The stockpile was noted to comprise brown silty sandy clay with gravel of brick, concrete, tile, plastic, metal and concrete boulders. A plastic oil drum with a black oil/ tar substance and black clinker gravel were also noted. The stockpile soils contain TPH in excess of the non-hazardous waste thresholds and contain asbestos at 0.877%. The materials would therefore be classified as hazardous asbestos waste for the purpose of off-site disposal.

2.2.3 Groundwater was encountered at depths between 1.20m and 4.40m as perched water within the Made Ground and at depth within the Folkstone Formation. Standing water levels ranged between 0.33 and 6.30m bgl.

2.3 Contamination Encountered

2.3.1 Visible potential Asbestos Containing Materials (ACM) were noted in the Made Ground at TP06 (0.3-0.9m bgl) and within TP205 and TP206 (0.2-0.3m) in the former brickworks area.

2.3.2 Hydrocarbon odours were also observed within the Made around the area of the two known USTs, and generally at depths of between 0.15m and 1.60m bgl).

2.3.3 The risk to end users from ground gas has been assessed as CS-2 (Amber 1) across the former depot area, and as CS-3 (Amber 2) across the former brickworks parts of the site due to elevated levels of carbon dioxide and elevated gas flow rates.

2.3.4 The contamination assessment identified elevated concentrations of arsenic and vanadium in the natural strata in the top meter site wide and arsenic, beryllium, lead (as localised contamination), cyanide and PAHs (including benzo(a)pyrene) in the Made Ground. The majority of the exceedances were noted in the brickworks part of the site. However, arsenic, lead and cyanide were also identified at elevated concentrations in the former depot area. The areas were individually statistically assessed, which indicated that arsenic, lead and cyanide were statistical outliers across the depot area and therefore could be discounted from the dataset.

2.3.5 Underground fuel storage Tanks (USTs) of unknown capacity are present in the northeastern portion of the former depot site. The Made Ground in this area identified elevated petroleum hydrocarbons (Aromatics C8-C35) above the residential with plant uptake end use assessment criteria. Perched water around the tanks have additionally been identified to be hydrocarbon impacted.

2.3.6 The Made Ground encountered at TP08 was visually identified to include extraneous materials such as brick and concrete and containing elevated PAH compounds, making it unsuitable for re-use and these materials are to be removed from site.

2.4 Sufficiency of information

2.4.1 The Geo-environmental Ground Investigation report (GE18721-GARv6.0 February 2023, has been submitted to the Local Planning Authority (South Downs National Park Authority) who has approved it. The LPA noted that further information was required with regards to additional surveys and a full remediation scheme would be required to satisfy Condition 16. The following abridged comments were made:

> The submitted ground investigation report was agreed. The report identified the need for additional surveys and that a full remediation scheme would be required (Condition 16).
>
> There were concerns about the potential contamination to groundwater, so we will likely consult the EA once we receive an application to discharge the details for Condition 16.

2.4.2 The Ground Investigation Report recommends a clean cover system is provided within the former brickworks area, but only in the northeastern and western portions of the site. Insufficient evidence has been provided within the CSM to justify a zoned approach within the north of the the site, and full remedial cover is recommended as a precaution.

3 Site Considerations

3.1 Unexploded Ordnance

3.1.1 A preliminary UXO risk assessment has been completed for the site and concluded a low risk of encountering unexploded ordnance.

3.2 Adjacent Residents

3.2.1 Residential and commercial properties are present adjacent to the site. Whilst they are not currently considered to be put at significant risk by the development of the site, dust suppression measures should be maintained throughout all demolition and construction phases to mitigate risks associated with asbestos and chemical contamination.

3.2.2 A further assessment is presented in Section 7 to characterise the risk from asbestos at this site. This assessment may be subject to change, based on observations during remediation.

3.2.3 No significant odours are anticipated to be generated as a result of the works. However, consideration should be given to storing any stockpiles formed from arisings at the northern boundary away from neighbouring residential properties. This would also serve to reduce plant movements and noise in the vicinity of the properties.

3.3 Dust Control Measures

3.3.1 Standard dust control measures should be always maintained across the site, including the dampening down of roadways, materials stockpiles, and any screening or crushing areas.

3.3.2 Stockpiles should be bladed down to reduce infiltration and minimise dust infiltration.

3.3.3 Routine dust monitoring is not considered necessary, except for any crushing activities; however, the Principal Contractor may wish to conduct such monitoring for reassurance and due diligence purposes.

3.4 Wastewater Disposal

3.4.1 Wastewater generated from site operations will require off-site disposal via tankers, or to sewer. Any disposal to sewer must be made under prior consent with the water authority by the operator.

3.4.2 Should discharge to sewer be considered, the wastewater provider must be consulted prior to mobilisation to obtain a discharge consent, along with establishing any compliance and monitoring targets.

4 Outline Remediation Strategy

4.1 General

4.1.1 This remediation strategy only considers the process of remedial action in terms of addressing the contamination recognised to date.

4.1.2 If during development or further investigation works, contamination not previously identified is found to be present, then an addendum method statement will be required, and the appropriate measures put in place. This is discussed further in the following report sections.

4.1.3 Laboratory analysis must be commissioned with testing houses that are suitably experienced and are MCERTS accredited with a quality assurance system.

4.2 Relevant Pollutant Linkages

4.2.1 The relevant pollutant linkages identified within the previous Ground Investigation Report are as follows:

Source	Pathway	Receptor
Asbestos within Made Ground soils	Disturbance and inhalation	Construction workers.
Ground gases (CO_2)	Migration, accumulation, and inhalation	End users of the site
Arsenic, lead & PAH in Made Ground	Inhalation and ingestions	End users (human health)
Organic contamination (PAHs) within Made Ground soils	Direct contact and permeation into potable water pipes	End users (via drinking water)
Known and unknown fuel UST	Vertical and lateral migration	Controlled waters (groundwater)
	Vapour intrusion	End users (human health)
Unexpected contamination	Unknown	Unknown

Table 3: Identified relevant pollutant linkages

4.3 Options Appraisal

4.3.1 As inorganic contaminants, asbestos and elevated ground gases have been detected within the Made Ground, specialist in-situ remediation or large-scale excavation and removal are not considered sustainable approaches, both in terms of cost, feasibility, and environmental impact. The installation of gas protection measures and an engineered capping layer in soft landscaped areas is considered to be the most viable and sustainable options for the site in the context of the proposed development.

4.3.2 Gross contamination, if present, is anticipated to be localised and small-scale, therefore bulk excavation and removal is likely to be the most effective remedial option. Where localised hydrocarbon contamination is encountered, the use of on-site bioremediation could be adopted to reduce the overall levels of contaminants to facilitate reuse on site or disposal at a lower cost. However, this is unlikely to be cost-effective for small volumes and is not considered at this stage.

4.4 Outline Remediation strategy

4.4.1 The remediation strategy has been determined in view of the previous ground investigation report findings and the proposed development scheme. The overall strategy can be summarised as setting out the design, installation, and verification requirements for the following:

i. Prepare a discovery strategy in the event of encountering unexpected or previously unencountered contamination.
ii. Establish asbestos controls for the construction works.
iii. Installation of barrier pipe for underground drinking water infrastructure.
iv. Establish a strategy for the removal of potential underground fuel tanks and infrastructure and contaminated soils.
v. Establish an engineered clean cover system for private rear gardens and other soft landscaping areas.

4.4.2 A Ground Gas Design Report addressing the Design and Verification Strategy for the installation of gas protection measures is also required for the site. This is to be issued under separate cover.

5 Material and Contamination Management

5.1 General

5.1.1 An initial site strip of buildings (following demolition), hardstanding and removal of Made Ground is required. The site strip will range in thickness between 360mm in buildings, 150mm in hardstanding and approximately 200mm in Made Ground, in accordance with the Soils Management plan (ERGO Drawings 23-1518-002 - 'Midhurst Isopachyte' and 23-1518-001 'Midhurst Volumetrics'.

5.1.2 The initial site strip will allow for inspection of the Made Ground and underlying natural soils following removal of hardstanding and building footprints to identify any areas of gross contamination, and to identify and remove any in-ground obstructions, such as relict walls, foundations and USTs.

5.2 Discovery Strategy

5.2.1 With the development of any site, there is a residual risk of contamination being found that is unexpected or has not been previously encountered.

5.2.2 As a precaution, the Principal Contractor should adopt the Discovery Strategy in Appendix B for dealing with unexpected contamination. The Principal Contractor should also ensure it is distributed and communicated appropriately to all relevant ground workers.

5.2.3 A discovery event shall be triggered if any of the following observations are made.

Contaminant	Criteria - Type	Criteria - Description
Petroleum hydrocarbon oils (TPH) & Polycyclic Aromatic Hydrocarbon (PAHs)	Visual	Liquid oil, oil saturated solids in veins or zones. Heavily stained or coated surfaces
	Headspace	Over 100 parts per million (ppm) Olfactory evidence (strong odours)
Free product (oil)	Visual	A visible free oil phase seeping from soils or floating on top of groundwater at a measurable thickness.
Asbestos Containing Materials (ACM)	Visual	Frequent fragments of cement bound or other material containing asbestos fibres.

Table 4: Contamination Triggers

5.3 Material Segregation

5.3.1 Soils should be segregated depending on the contaminant levels, strategy for reuse, remediation requirements and any actions resulting from a discovery event. In general:

Hydrocarbons impacted soils are to be stockpiled on impervious material and covered, pending off-site treatment/disposal.

All reasonable efforts should be made to minimise the handling of asbestos impacted soils. Where possible, asbestos impacted waste should be excavated and placed directly in a designated haulage vehicle. Where stockpiling is necessary, the stockpile must be kept damp and covered.

Soils free of gross contamination will be stockpiled separately to allow reuse on site, or off-site disposal if surplus to requirements.

5.4 Underground Storage Tanks & Interceptors

5.4.1 Two Underground Storage tanks (UST's) are present in the former depot part of the site, in the northeast and there is a potential that further buried tanks may be encountered during redevelopment. Interceptors are also likely to be present. All redundant interceptors and USTs must be removed from site, along with all associated pipework. Any gross contamination present must be delineated and removed.

5.4.2 Specialist advice should be sought to ensure they are appropriately decommissioned prior to excavation for removal. As a minimum, it is expected that all residual fuel/oil should be removed from the tanks and pipework prior to removal, and any tanks previously containing volatile substances should be inerted.

5.4.3 A watching brief, by a competent geo-environmental consultant, is required during the removal of all tanks and interceptors to facilitate inspection and delineation of the contamination and to undertake verification sampling and testing of remaining soils.

5.4.4 A formal procedure for the decommissioning and removal of underground storage tanks is presented within Appendix C.

5.4.5 Disposal records of the tanks and their contents must be provided for inclusion to the Verification Report.

5.5 Hydrocarbon Impacted Soils and Free-Phase Contamination

5.5.1 Where hydrocarbon impacted soils or free phase hydrocarbons are encountered, the Contractor must notify the Consultant, and instruct them to attend site.

5.5.2 Any free phase contamination or localised soil 'hotspots' considered to be grossly contaminated with hydrocarbons should be removed from site.

5.5.3 In the event that significant volumes of contaminated soils are encountered, consideration should be given to on-site bioremediation as a more sustainable and cost-effective alternative. Should bio-remediation be considered, the remedial strategy will require updating and approval rom the regulator sought.

5.5.4 Free phase hydrocarbons (oil) must be removed from excavations using pumps, and/or absorbent pads, and placed within secure above ground containers. Current investigations suggest free-phase contamination is very limited on site, therefore it is recommended to dispose of contaminated waters off-site. Alternatively, the water can be treated and disposed to sewer (under consent from the operator).

5.5.5 The Contractor must have an experienced Geo-environmental Consultant present during hotspot excavations and free phase removal to aid in the characterisation, delineation, and segregation of materials, and to take appropriate records and samples for verification purposes.

5.5.6 Any excavated contaminated soils not being placed directly in a skip/wagon must be placed in a secure bunded area on site and covered with impermeable sheeting.

5.5.7 Delineation of impacted areas shall be based on visual and olfactory observations, with the remaining soils inspected, sampled, and tested for verification purposes.

5.6 High-Risk Areas

5.6.1 There is limited information regarding the ground conditions under areas of existing building footprints, and therefore previously unencountered contamination may be present.

5.6.2 Hydrocarbon impacted soils also should be anticipated in the vicinity of underground fuel storage tanks.

5.6.3 Asbestos Containing Materials (ACM) were visually identified in the form of cemented corrugated sheeting in the Made Ground at TP06, located in the south of the former depot area of the site (0.3-0.90m bgl). The soils matrix in the Made Ground in this area did not identify any asbestos fibres, however given the presence of bulk ACM, the presence of asbestos fibres cannot be discounted. It is also possible that further asbestos containing materials will be encountered when undertaking bulk excavation and material movement works.

6 Contaminant ‘Hot-Spot’ Removal

6.1 General

6.1.1 Three contaminant hotspots were identified within the Ground Investigation Report which require delineating, followed by the complete removal of contaminated materials.

6.1.2 These are as follows:

Hotspot Location	Depth Range	Contaminant of Concern	Chemical Verification
TP06 (Depot area, south)	0.30m – 0.90m	Cemented chrysotile asbestos cement	N/A Visual assessment only
TP08 (Depot area, south)	0.00m – 0.50m	PAH compounds within Made Ground	USEPA PAH 16 Suite
Known USTs and impacted ground (Depot area, northeast)	Unknown	Fuel oils (TPH, PAHs)	TPH CWG Suite + BTEX USEPA PAH 16 Suite

Table 5: Contamination Triggers

6.2 Verification Works

6.2.1 All delineation and removal works must be overseen by the Consultant to ensure the works are varied out appropriately, to support in the delineation and segregation of materials and to obtain the appropriate lines of evidence.

6.2.2 A chemical verification sample must be obtained and analysed from each sidewall of the excavation, along with two samples from the base of the excavation, unless it can be otherwise demonstrated the contaminant linkage has been successfully severed. Further sidewall and base samples must be taken for every 10 linear metres.

6.3 Hotspot Extents

6.3.1 In all locations, the contaminants are thought to be localised, and of sufficiently limited extent where the bulk excavation and removal of materials is a practicable and sustainable method of remediation. Where delineation works indicate the contamination is extensive, this a Contamination Discovery Event should be triggered.

6.4 Hotspot Locations

6.4.1 A figure showing the approximate location of TP06 and TP08 is shown below, extracted from Figure 7 within the Ground Investigation Report.

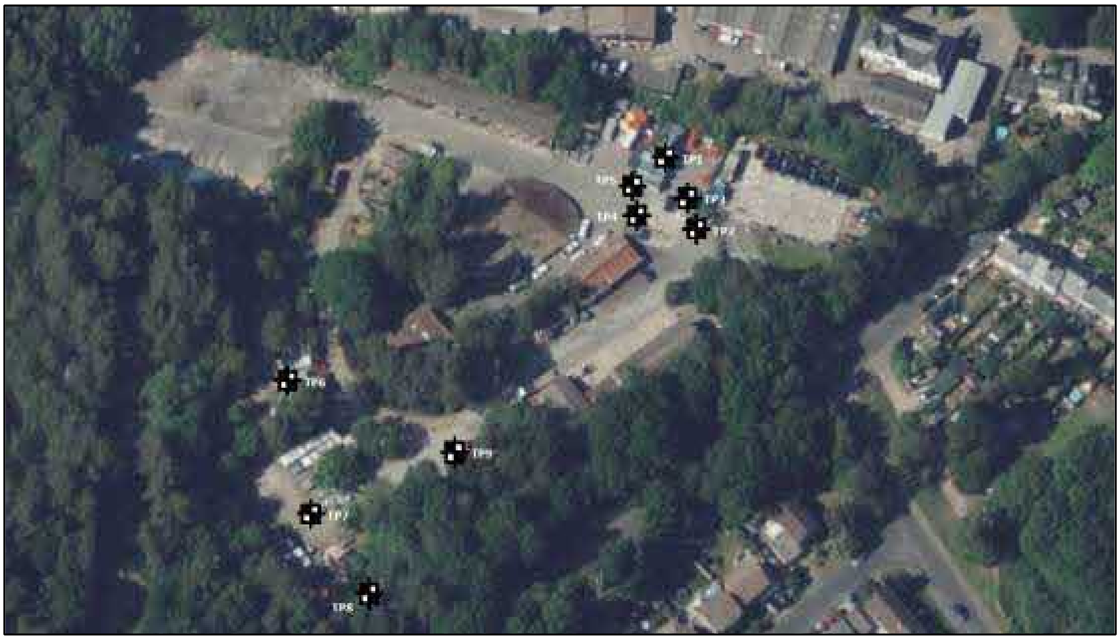

Figure 2: Hotspot Locations (TP06 and TP08)

6.4.2 A figure showing the approximate location of known USTs is shown below, extracted from Figure 16 within the Ground Investigation Report.

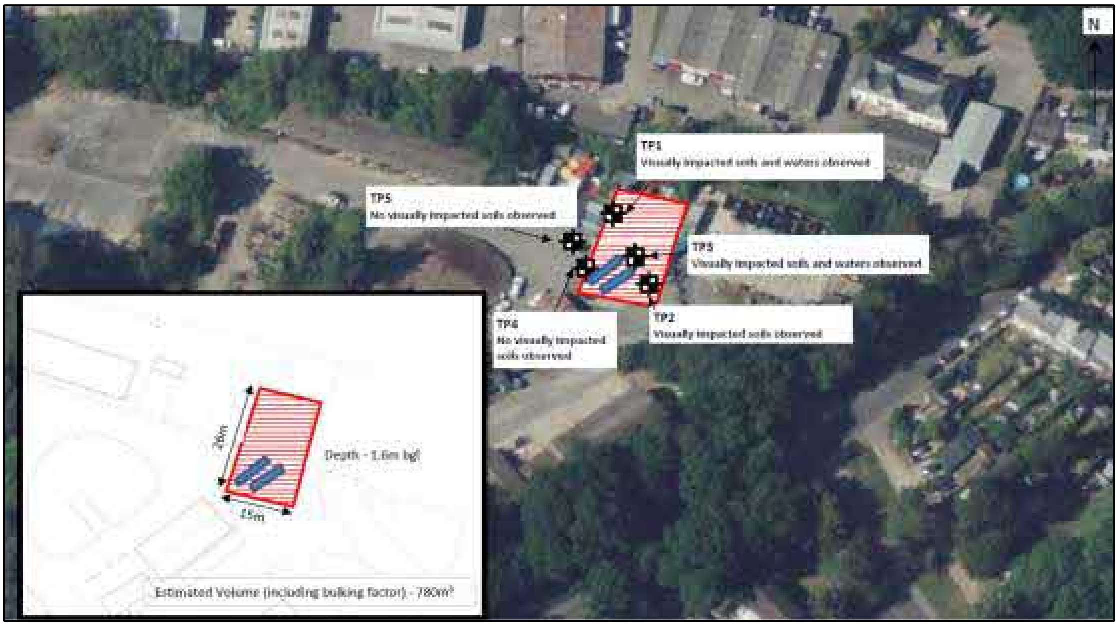

Figure 3: Known UST locations

7 Asbestos Management

7.1 Asbestos Impacted Areas

7.1.1 Soils containing visual bulk Asbestos Containing Materials (ACM) were identified at TP06 at 0.50m (the southern depot area) and in TP205 (0.2m) and TP206 (0.30m) (northern brickworks area) and confirmed by laboratory analysis chrysotile cement. No asbestos fibres were detected in the soils.

7.1.2 Asbestos has been identified in "Stockpile 3" at 0.9% and this material will need to be handled and disposed of off-site as hazardous asbestos waste.

7.2 Licensing Status

7.2.1 Due to the type and quantity of asbestos identified at the site to date, the works are not currently deemed to be licensable works and accordingly would not require licensed asbestos contractors, or notification to the HSE.

7.2.2 Should friable ACMS or gross asbestos contamination be encountered, the licensing status should be reviewed, along with undertaking a risk assessment of current working practices.

7.3 Remedial Measures – Brickworks Area

7.3.1 Within the northern (brickworks) area, due to hardstanding coverage and the clean cover system in soft landscaping areas, there is no unacceptable risk to proposed end users of the site with regards to asbestos, and no specific remedial action required.

7.4 Remedial Measures – Depot Area

7.4.1 Within the southern (depot) area, no clean capping system is required. It is therefore imperative that all ACMs within 800mm of surface in proposed soft landscaping areas are removed entirely.

7.4.2 A trenching delineation exercise is required commencing at the TP06 location. Excavation works must continue to remove all ACMs to a depth of 800mm below FFL in soft landscaped areas.

7.4.3 Removal works are expected to comprise a combination of hand-picking to remove large fragments of cemented ACMs, and bulk excavation where ACMs are observed to be heavily broken and too frequent for hand-picking to be a practicable option.

7.4.4 Delineation and removal works will be undertaken through visual assessments only and be evidenced by the Consultant through provision of a watching brief.

7.4.5 The remedial approach of localised hand-picking and bulk excavation of ACM impacted soils is based on low levels of cemented ACMs being present. Should frequent occurrences of cemented ACMs be encountered, or fibrous ACMs of any volume, then works should be halted and the consultant informed.

7.4.6 It is accepted that sporadic and infrequent occurrences of ACMs will remain following completion of the works. Cemented ACMs at such low frequencies will not cause an unacceptable risk to future residents.

7.5 PPE & Hygiene Protocols

7.5.1 For general working, standard PPE and hygiene protocols for working on brownfield sites are considered adequate to mitigate against the low levels of asbestos on site, and no additional special precautions are required. This includes localised hand-picking of isolated ACMs and small-scale machine excavation of impacted soils.

7.5.2 Where frequent ACMs are detected, and during the disposal of materials from Stockpile 3, additional precautions are required including the wearing of disposable overalls an FFP3 disposable masks, and ensuring dust suppression techniques are adopted throughout.

7.5.3 Where suspected ACMs are identified in a form other than cement-bound corrugated sheeting, additional precautions may be required, as outlined in the following sub-sections.

7.6 Competency and Training

7.6.1 For general works across the site, workers should have Asbestos Awareness training as a minimum. This includes bulk soil removal with infrequent/sporadic fragments of suspected cement-bound ACM materials within it.

7.6.2 For any works within ACM impacted areas, works should be supervised by a Consultant/Specialist who has received training for Non-Licensed Work (NLW) on asbestos in soil. Any hand-picking should be undertaken directly be an NLW accredited worker.

7.7 Key Risks

7.7.1 The presence of asbestos does not in itself constitute a danger. However, asbestos may become hazardous when exposed, disturbed or damaged and must be treated accordingly.

7.7.2 Activities which give rise to airborne dust, such as excavation and earth moving works, are most likely to present risks. The weather also plays a critical role, with prolonged dry periods leading to increased dust generation, whilst wet weather provides dust suppression.

7.7.3 In all instances where work is likely to disturb soils impacted with significant amounts of ACM materials, the Principal Contractor should ensure a plan of works is in place which outlines their asbestos control measures. This must ensure the presence of asbestos has been risk assessed and ensure the workers are trained and competent to carry out the works proposed.

7.7.4 To minimise dust generation, ACM impacted Made Ground soils should not be left exposed at surface for prolonged periods; the covering of such materials should be undertaken as soon as is reasonably practicable and kept damp until done so. This should include the covering of Stockpile 3.

7.8 Asbestos Control Measures

7.8.1 All employers have a duty of care under HSE regulations to undertake their own risk assessments and method statements.

7.8.2 To aid in the assessment of risk and derivation of appropriate method statements, examples site-specific scenarios are outlined below.

Activity	Licensing Status	Recommended Training	Example Mitigation Measures
Excavations and material movements of Made Ground with frequent occurrences of cement-bound ACMs. [impacted ground]	Non-licensed	Non-licensed asbestos work training	Undertake asbestos air monitoring. EN149 type FFP3 disposable mask and wearing of disposable blue overalls. Adoption of basic dust suppression techniques. For example; Mechanical misting / low-pressure spraying to dampen soils, where dry. Avoid stockpiling impacted ground where possible, by direct placement upon excavation. Any stockpiles should be kept covered. Upon placement in-ground, cover/encapsulate as soon as practicable. Provision of basic personal decontamination facilities.
Hand-picking of cement-bound ACMs for removal from site.	Non-licensed	Non-licensed asbestos work training	EN149 type FFP3 disposable mask and wearing of disposable blue overalls. Wetting of material via. hand-spray or mechanical misting.
Encountering suspected ACMs in a form other than asbestos cement	Possibly notifiable and licensable.	Assessment required	Assessment required. Actions and precautions are dependent upon the type, condition, extent, and mass of asbestos identified.
Excavations and earthworks of materials with no, or sporadic occurrences of ACMs only.	Non-licensed	Asbestos awareness, supplemented by site specific asbestos control and response procedures.	No specific RPE or PPE required. Adoption of basic dust suppression techniques where soils are dry.

Table 6: Activity-based risk assessment

7.9 Asbestos Air Monitoring

7.9.1 No heavily impacted ground has yet been identified on site, beyond the materials contained within Stockpile 3. Therefore asbestos air monitoring and reassurance boundary monitoring is not required, but may be undertaken at the discretion of the contractor for their own due diligence purposes.

7.10 Verification Strategy

7.10.1 All watching brief records and site inspections must be collated into the Verification Report, along with a summary of the removal works undertaken, volumes of wastes disposed of, and annotated site plans.

8 Drinking Water Infrastructure

8.1 General

8.1.1 Protective barrier pipe is recommended for all new below-ground water supply pipes (Protectaline or similar), together with backfilling trenches with clean, inert granular fill (shingle).

8.1.2 Where existing water pipes are to remain in use, these should be upgraded to ensure the same level of protection is in place across the site.

8.1.3 The local water authority should be consulted to inform them of the risk assessment, and to obtain their approval.

8.2 Verification Strategy

8.2.1 This is to be validated by the Contractor through the provision of delivery tickets showing protective barrier pipe has been delivered to site and by providing photographs showing the subsequent installation.

8.2.2 The Principal Contractor should also consult the local water authority to determine any further verification requirements.

9 Material Compliance and Soil Suitability

9.1 Material Sourcing

9.1.1 An engineered clean cover system is required within the northern site area and limited suitable soils are present on site. Therefore, soils (including topsoil) will require importing to support the proposed landscaping scheme.

9.1.2 Imported, and site-won materials may also be utilised as general fill below the cover system and will be done so under a Materials Management Plan.

9.2 Contractor Pre-delivery Compliance Checks

9.2.1 The Contactor should confirm the origin of all imported materials and request available chemical testing results from suppliers prior to delivery, to provide confidence of suitability. All associated records should be provided to Soiltechnics ahead of delivery. Materials suitability assessments will be required to confirm the donor site suitability.

9.3 Contractor Requirements Upon Delivery

9.3.1 The source and volume of all imported fill and soil materials used in the development must be clearly documented, with records provided for inclusion in the Verification Report.

9.3.2 For all imported materials, the Principal Contractor should maintain records sufficient to evidence the following:

- The supplier
- Material source (address)
- Material origin (e.g., virgin material, recycled, manufactured)
- Material type (e.g., topsoil, subsoil, recycled aggregate, 6F2, etc.)
- The overall volume of each material type imported.
- Delivery dates.
- The overall volume of each material type imported, as part of each batch.
- Inspection records of the materials to confirm the physical, visual, and olfactory suitability of the material, at the following frequencies:
  - Clean cover soils: An inspection of every other delivery of landscaping soil (1 in 2).
  - Fill materials: An inspection of each “batch” of fill materials.

9.3.3 A ‘batch’, in the context used above can comprise of multiple deliveries from the same source, delivered over consecutive days for a period of no more than one working week.

9.4 Material Suitability Criteria

9.4.1 All imported soils and fill material should be inspected and tested to confirm they are chemically and physically suitable for use, in terms of the risks to human health.

9.4.2 Soils imported from other developments under a Materials Management plan must also be clean and naturally occurring, and not increase the level of risk to the environment.

9.4.3 The physical composition of materials must be free of harmful and injurious artefacts (such as sharps), over-sized materials (such as cobbles and boulders) and show no visual or olfactory evidence of contamination.

9.4.4 Materials should also be chemically suitable, with concentrations of contaminants falling within widely recognised and published soil guideline values (such as the C4SLs and S4ULs), with the following model being applied.

Residential, with plant uptake at 2.5% SOM

9.4.5 No ACM fragments should be present within the clean soil cover system. Where asbestos fibres have been detected, this should be limited to no more than 1 in 4 samples and quantified at <0.001%.

9.5 Unsuitable Materials

9.5.1 If an inspection of a materials proves or suspects it to be unsuitable, the load should be quarantined on site, pending collection or off-site disposal. The Consultant should be notified, and a record made for inclusion into the Verification Report.

9.5.2 Alternatively, the Consultant should undertake an investigation and risk assessment to delineate the impacted soils and to identify a possible alternative use for the materials.

9.6 Inspection Verification Strategy

9.6.1 Site visits by a geoenvironmental consultant are required during the placement of fill materials to inspect and photograph the works being undertaken.

9.6.2 The visual inspection strategy for the clean cover system is outlined in the following report section.

9.7 Chemical Verification Strategy

9.7.1 Any grossly contaminated materials will be excavated and segregated either for off-site disposal or on-site treatment. The frequency of verification sampling for the remaining materials is outlined in the following table.

9.7.2 All verification sampling must be undertaken by the Consultant. In addition, an inspection of the soils at the time of sampling must confirm the physical, visual, and olfactory suitability of the material. The following table summarises the sampling and chemical verification requirements.

Material Type	Sampling Frequency	Sampling Timing	Testing Schedule
Clean cover system (soft landscaping)			
Topsoil and Subsoils	1 per $50m^3$, Minimum of 3 per batch Minimum of 3 per type	After placement. Reassurance sampling prior to placement is recommended.	Metals Suite, pH Cyanide (free and complex) Asbestos screen, PAHs (USEPA 16) Banded TPH
Recycled Aggregate (no-dig layer)	1 per $250m^3$, Minimum of 2 per batch	Before, during or after placement	Metals Suite, PAHs (USEPA 16) Asbestos screen
Virgin Quarried Materials (no-dig layer)	N/A	N/A	Visual check only
Imported Fill Materials			
Coarse Recycled Aggregate (no visible fines)	N/A	N/A	Visual check only
Virgin Quarried Material	N/A	N/A	Visual check only
Other fill materials	1 per $250m^3$, subject to a minimum of 3 per type and source.	Once imported, from stockpiles, or following placement	Metals Suite, pH Cyanide (free and complex) Asbestos screen, PAHs (USEPA 16) Banded TPH
Remedial Activity			
Remaining soils following UST / interceptor removal	Each side wall and two base samples. Additional samples for every 10m length.	Prior to backfill	Tanks: PAHs, BTEX and TPH CWG
Remaining soils following removal of contaminant 'hot-spots'.			Hotspots: Targeted for contaminant of concern
Fuel/oil pipework removal	One per linear 5m of remaining soils.	Prior to backfill	PAHs, BTEX and TPH CWG

Table 7: Verification Sampling Plan

9.7.3 A 'batch', can comprise of multiple deliveries from the same source, delivered over consecutive days for a period of no more than two weeks.

9.7.4 A metals suite must include arsenic, cadmium, chromium (total and VI), copper, lead, mercury, nickel, selenium, and zinc.

9.7.5 Laboratory detection limits should be sufficiently low to enable comparison with the respective screening values.

10 Soft Landscaping Clean Cover

10.1 Depot (southern) area

10.1.1 No remedial clean cover system is required within the southern depot area; however, topsoils are limited and the developer must ensure a suitable growing medium is provided. A minimum 150mm of topsoil cover is required.

10.1.2 The Principal Contractor should satisfy themselves that the materials underlying the topsoils are chemically and physically suitable as a subsoil growing medium, to the following minimum depths; however, such requirements fall outside of the formal scope of this Remediation Strategy.

Grassed areas:	450mm
Plants and shrubs:	600mm
Trees:	900mm

10.2 Brickworks (northern) area

10.2.1 Within the northern brickworks area, a clean cover system is recommended. Where present, the provision of hardstanding areas will negate the requirement for a clean cover system, and no action is considered necessary.

10.2.2 Within this area, soft landscaping areas comprise predominantly comprise private rear gardens, front gardens, landscaped areas planted areas of shrubs and hedgerows and areas of public open space. It is assumed that infrequent excavation and planting in soils would occur in public open space, and would be managed under a commercial contract.

10.2.3 The following layers should be applied, in order to provide protection for the scheme.

Private gardens: Minimum 750mm of cover, comprising:

- Min. 600mm soil cover, of:
  - Topsoil, between 150mm and 300mm thick
  - Subsoil, making up the remainder of the soil cover
- High-visibility geotextile layer / terram
- Min. 150mm capillary break layer / compact no-dig layer

Public open space: Minimum 600mm of cover, comprising:

- Min. 450mm soil cover, comprising:
  - Topsoil, between 150mm and 300mm thick
  - Subsoil, making up the remainder of the soil cover
- High-visibility geotextile layer / terram
- Min. 150mm capillary break layer / compact no-dig layer

10.3 Additional Design & Suitability Considerations

10.3.1 Chemical verification of clean cover materials is required following placement. However, undertaking additional chemical testing on stockpiled soils prior to placement should also be considered to provide confidence of material compliance before use.

10.3.2 The developer and their landscape designer should consider the localised deepening of the cover system in areas of proposed tree and shrub planting.

10.3.3 The suitability of soils as a growing medium (irrespective of the risk to human health) could be evidenced through sampling and analysis in accordance with BS:3882 (2015).

10.3.4 Whilst desirable, these recommendations do not form part of the remedial strategy and have been included for reference. Site specific advice should be sought from the landscape designer regarding the suitability of soils as growing mediums and any requirements for deepening the cover system to accommodate the planting scheme.

10.4 Contractor Requirements

10.4.1 In addition to the requirements outlined in the Soils and Material Compliance report section, the contractor must provide photographic evidence demonstrating the laying of the clean cover system, and the geotextile layer/ no dig marker layer over the 150mm capillary break.

10.5 Verification Strategy

10.5.1 The verification of the chemical and physical suitability of soils is outlined within Material Compliance and Soil Suitability report section.

10.5.2 A site visit will be required during construction of the cover system to witness the laying of the 150mm no-dig layer.

10.5.3 Upon completion of the cover system, at least one further site visit will be required by the Consultant to undertake a series of hand pits to visually inspect, document, photograph, and sample the soils to verify adherence to this Remediation Strategy.

10.5.4 Based upon the development proposals, the following number of inspection pits are required. Each pit much penetrate the full depth of the cover system to expose the top of the underlying geotextile marker layer. An inspection frequency of 1 in 3 plots is recommended based on NHBC guidance and an estimate of 27 plots and 2 flat blocks.

Private gardens: 9 inspection pits.

Shared gardens (flats): 2 inspection pits

Public open space: 2 inspection pits

10.5.5 The hand pits should demonstrate an adequate thickness of cover, confirm physical suitability, and obtain samples so the chemical suitability can be confirmed through laboratory analysis.

10.5.6 Verification must be completed by a competent geoenvironmental consultant, with a record of each visit made for inclusion in the Verification Report.

11 Ground Gas Protection Measures

11.1 Preliminary Gas Protection Designs

11.1.1 The ground gas risk assessments undertaken concluded the following gas protection classification applies.

Aspect	Site Assessment
CS gas classification [BS 8485 Table 2]	CS-2 within the Depot (southern) area CS-3 within the Brickworks (northern) area
Building Type [BS 8485 Table 3]	Type A
Minimum gas protection score	3.5 points (CS-2) 4.5 points (CS-3)

Table 8: Gas Characterisation Summary

11.2 Detailed Gas Protection Measures

11.2.1 A detailed gas protection design report must be prepared by a suitably competent specialist in accordance with BS8485. The report should include the basic recommendations to achieve the gas protection score, and provide further supporting detail, including:

Relevant construction and building related details.

The gas protection designs, product specifications, and justifications.

The provision of pre-construction drawings and construction notes, where possible.

Recommendations on the expected qualifications and experience of the installer and independent verifier.

11.2.2 The design report should also include a verification plan which is carried out in accordance with CIRIA C735 (2014). This should be submitted to the Local Authority in advance to ensure agreement with the proposals.

11.3 Verification Strategy

11.3.1 All ground gas protection measures will require independent on-site verification through a combination of visual inspections and integrity testing.

11.3.2 The verification works must be done in accordance with the verification plan, as detailed in the Detailed Design Report, with a record of each visit produced for the Verification Report.

11.3.3 Upon completion of the installation, a Verification Report must be completed and issued to the Local Authority prior to occupation.

11.3.4 The Verification Report should be completed in accordance with the recommendations within CIRIA C735, and as a minimum include a statement confirming that the gas protection measures were installed and verified in accordance with the Design Report.

12 Verification Report

12.1 General Requirements

12.1.1 The verification requirements discussed above should be compiled into a Verification Report, which is to be produced on completion of the remedial works and prior to occupation of the development. The following sets out the general requirements for reporting of the verification works.

12.2 Client / Contractor Requirements

12.2.1 Supporting information will be required from the client and their contractors. This includes the following:

Appropriate site plans confirming the as-built layout of the site.

Photographic evidence of the barrier pipe installation.

Signed delivery tickets, or an alternative reference system to track imported loads, including a statement on the type and volume of materials imported.

All waste transfer documentation, including a statement on the type and volume of materials taken off-site.

Details on any unexpected ground conditions encountered and contingency arrangements that had to be implemented.

12.3 Report Requirements

12.3.1 The Validation Report will include the following, where appropriate:

A summary of all remedial works undertaken.

A concise summary of material types, sources and volumes imported.

Lines of evidence to demonstrate compliant and effective material management, including confirmation of source, volumes and suitability of all imported materials, delivery notes, waste transfer and consignment notes and chemical testing records.

Details demonstrating the chemical and physical suitability of the clean capping materials.

Details of on-site bio-remediation undertaken including testing demonstrating suitability, where reuse has occurred.

Site inspection records, including hole location plans, logs of excavations and photographic records as necessary.

A copy of the ground gas installation verification report.

Details of any unexpected or unencountered materials encountered, along with further investigative and remedial action undertaken.

Statements confirming if the remedial objectives have been met, and if the site is suitable for its proposed use.

Appendix A Drawings

ERGO SOILS MANAGEMENT PLAN – MIDHURST, BEPTON ROAD

ERGO has prepared this soils management plan as a guide to the efficient handling of soil materials, with respect to the anticipated volumes of spoil that will be generated by the general cut / fill of the site to Enabling Works Levels (EWL) and from civil engineering works. In the preparation of this SMP, ERGO has undertaken a 3D volumetric assessment of the proposed cut / fill operations using the original topographical survey as a base point and working to the assumed formation levels (as outlined below and agreed with the client).

ERGO has also undertaken a volumetric assessment of the soil that will arise as part of the construction of the highways, drainage infrastructure and plot foundations. For the purposes of this assessment and in consideration of the standard construction requirements, ERGO has produced a cut / fill volumetric assessment to achieve the following Enabling Works Levels (EWL) from the Finished Floor Levels (FFL) or Finished Ground Levels (FGL):

- Building Footprint (Piled) – 750mm below FFL
- Building Footprint (Shallow Strip & Mass Trench) – 500mm below FFL
- Driveways / Car Parking – 435mm below FGL
- Roadways – 770mm below FGL
- Footpaths – 300mm below FGL
- Garden / POS & Landscaping in South – 300mm below FGL
- Gardens (North) 750mm below FGL
- POS / Landscaping (North) – 600mm below FGL
- SUDS – As per the provided drawings

The proposed earthworks operations as outlined below are for indicative purposes and have been prepared in due consideration of the anticipated estimated materials volumes and likely construction phasing. The assessment of foundation spoil has been assumed in due consideration of the foundation recommendations detailed in the Gravity Consulting Engineers Preliminary Foundation Appraisal drawing ref: W2115_GSK-001 (undated).

The Premier Energy Site Investigation ref: 603531, dated October 2022 and the Geo-Environmental Ground Appraisal Report reference GE18721-GARv5.0-JAN23, dated January 2023 record the site surface materials to be variable comprising Made Ground, hardstanding of concrete and tarmac, and buildings with assumed concrete floor slabs. Based on the exploratory hole information provided, the site strip has been modelled as average thicknesses of surface Made Ground of 200mm, areas of hardstanding at an average thickness of 150mm and average strip beneath buildings of 350mm.

Proposed levels have been provided from Ardent Consulting Engineers Drawings ref: 2207820-006 Draft Issue, dated January 2023.

ERGO have not been provided with a detailed Drainage Strategy for the site. The model should be updated following detailed design.

Topographical information has been provided by D & H Surveys ref: CAD File METIS-Midhurst-Brickworks-Final, dated: December 2018. Several stockpiles of unknown materials are noted on the topo which have been included within the assessment.

If materials arisings from foundations, drainage arisings and any other deeper excavations do not generate enough clean/suitable natural materials, clean subsoils may require importation to site to complete the clean cover systems in soft landscaping areas. This could also increase the excess of Made Ground materials on site.

The Isopachyte Cut / Fill drawing details the depths of cut / fill to achieve the Enabling Works Levels (EWL) prescribed above (Drawing 23-1518-002). This assessment has been prepared in due consideration of the proposed development with an overarching assessment of Cut / Fill works included within ERGO Drawing (23-1518-001).

MM1	***Site Strip from Building Areas Arisings – estimated thickness of concrete slabs*** Current estimated areas of site where buildings are noted equates to a total area of 3,078m² with a preliminary estimated thickness of 350mm. A volume of circa 1,077m³ has been estimated for the concrete slabs in this area, however this should be confirmed following demolition. It is assumed that concrete will be crushed and reused within the build-up/ subbase for roads/ driveways/ pile mats/ etc.	1,077m³ (Cut)	1,077m³ Excess* *To be used as crush material pending suitability
MM2	***Site Strip of Hardstanding Areas– estimated thickness of concrete and tarmac materials*** Current estimated hardstanding areas on the site equates to a total area of 15,122m² with a preliminary estimated thickness of 150mm. A volume of circa 2,268m³ has been estimated for hardstanding on site, however this includes both concrete and tarmac materials. It is assumed that concrete will be crushed and reused within the build-up/ subbase for roads/ driveways/ pile mats/ etc. It has been assumed that tarmac does not contain significant coal tar and would be permitted for reuse- this should be confirmed.	2,268m³ (Cut)	2,268m³ Excess* *To be used as crush material pending suitability
MM3	***Site Strip of Surface Made Ground*** Current estimated Made Ground of the site equates to a total volume of circa 2,195m³ for an estimated average thickness of 200mm over an area of 10,974m². Where material is cut, it has been assumed that it will generally bulk to 110% of the original volume and as such an approximate additional 220m³ of material will be generated from site operations. A total Made Ground volume of 2,415m³ has been estimated for the site (this includes bulking). The material types are varied across the site and it should be noted Made Ground is noted to extend deeper on site than the depth of the site strip which has been modelled.	2,415m³ (Cut - Including Bulking)	2,415m³ Excess Re-use 2,415m³ in Plots – SS & MT (MM5) pending suitability of materials
MM4	***Cut & Fill Plots (Piled) to 750mm below FGL*** A total Cut of 1,301m³ will be generated from excavations to Piled plots to achieve 750mm below plot FFL. A total Fill of 506m³ is required to achieve 750mm below Piled plot FFL. An Excess of 795m³ has been estimated.	1,301m³ (Cut) & 506m³ (Fill)	795m³ Excess Re-use 605m³ in Plots – SS & MT (MM5) Re-use 190m³ in Driveways (MM6)
MM5	***Cut & Fill Plots (SS & MT)) to 500mm below FGL*** A total Cut of 265m³ will be generated from excavations to SS/MT Plots to achieve 500mm below plot FFL. A total Fill of 3,285m³ is required to achieve 500mm below SS/MT plot FFL. A Shortfall of 3,020m³ has been estimated.	265m³ (Cut) & 3,285m³ (Fill)	3,020m³ Shortfall Re-use 2,415m³ from Surface Made Ground (MM3) pending suitability Re-use 605m³ from Plots - Piled (MM4)
MM6	***Cut & Fill Driveways to 435mm below FGL*** A total Cut of 229m³ will be generated from cutting driveways to 435mm below FGL. A total Fill of 1,037m³ of material is required to fill driveways to a minimum level of 435mm below FGL. A Shortfall of 808m³ has been estimated.	229m³ (Cut) & 1,037m³ (Fill)	808m³ Shortfall Re-use 190m³ from Plots - Piled (MM4) Re-use 379m³ from Roadways (MM7) Re-use 67m³ from Gardens – North (MM10) Re-use 172m³ from POS/ Landscaping – North (MM11)
MM7	***Cut & Fill Roadways to 770mm below FGL*** A total Cut of 857m³ will be generated from cutting roadways to 770mm below FGL. A total Fill of 478m³ of material is required to fill roadways to a minimum level of 770mm below FGL. An Excess of 379m³ has been estimated.	857m³ (Cut) & 478m³ (Fill)	379m³ Excess Re-use 379m³ in Driveways (MM6)
MM8	***Cut & Fill Footpaths to 300mm below FGL*** A total Cut of 209m³ will be generated from cutting footpaths to 300mm below FGL. A total Fill of 905m³ of material is required to fill footpaths to a minimum level of 300mm below FGL. A Shortfall of 696m³ has been estimated.	209m³ (Cut) & 905m³ (Fill)	696m³ Shortfall Re-use 400m³ from POS/ Landscaping – North (MM11) Re-use 296m³ from SUDS (MM12)
MM9	***Cut & Fill Gardens / POS / Landscaping (South where no Clean Cover is modelled) to 300mm below FGL*** A total Cut of 652m³ will be generated by reducing gardens / POS / landscaping (South) to 300mm below FGL. A total Fill of 3,652m³ is required to achieve 300mm below garden / POS / landscaping (South) FGL. A Shortfall of 3,000m³ has been estimated.	652m³ (Cut) & 3,652m³ (Fill)	3,000m³ Shortfall Re-use 641m³ from SUDS (MM12) Re-use 2,359m³ from Drainage Arisings (MM17)
MM10	***Cut & Fill Gardens (North where Clean Cover System is Required) to 750mm below FGL*** A total Cut of 129m³ will be generated by reducing gardens (North) to 750mm below FGL. A total Fill of 62m³ is required to achieve 750mm below garden (North) FGL. An Excess of 67m³ has been estimated.	129m³ (Cut) & 62m³ (Fill)	67m³ Excess Re-use 67m³ in Driveways (MM6)
MM11	***Cut & Fill Public Open Space / Landscaping (North where Clean Cover is Required) to 600mm below FGL*** A total Cut of 776m³ will be generated by reducing POS/ landscaping (North) to 600mm below FGL. A total Fill of 204m³ is required to achieve 450mm below POS/ landscaping (North) FGL. An Excess of 572m³ has been estimated.	776m³ (Cut) & 204m³ (Fill)	572m³ Excess Re-use 172m³ in Driveways (MM6) Re-use 400m³ in Footpaths (MM8)
MM12	***Cut & Fill SUDS to levels recorded on drawings.*** A total Cut of 1,000m³ will be generated by reducing the SUDS areas to levels recorded on drawings. A total Fill of 63m³ is required to achieve the levels recorded on the drawings for the SUDS. An Excess of 937m³ has been estimated.	1,000m³ (Cut) & 63m³ (Fill)	937m³ Excess Re-use 296m³ in Footpaths (MM8) Re-use 641m³ in Gardens/ POS South (MM9)
MM13	***Reuse of Site Won Topsoil in Private Gardens & Public Open Space/ Landscaping (North & South).*** Residential garden and landscaped/ POS areas have been calculated at an area of 11,222m². It considered that 150mm topsoil will be installed within garden areas and landscaping/ POS areas to provide a growing medium. Therefore, 1,683m³ of clean/suitable topsoil will be required on the site.	1,683m³ Fill	1,683m³ Clean Suitable Topsoil to Import
MM14	***Reuse of Site Won Subsoil in Private Gardens & Public Open Space/ Landscaping (South Only where no cover system is modelled).*** Residential gardens, POS and landscaping areas in the south of the site where no cover system has been identified have been calculated at an area of 7,579m². It considered that 150mm Subsoil will be installed within garden areas to provide the required growing medium. Therefore, 1,137m³ of Subsoil will be required for reuse on the site dependent upon suitability of materials.	1,137m³ Fill (Gardens /POS/ Landscaping- South)	1,137m³ Shortfall Re-use 1,137m³ from Drainage Arisings (MM17) dependent upon the suitability of the materials.
MM15	***Reuse of Site Won Subsoil in Private Gardens (North Only where a clean cover system is required).*** Residential garden areas in the north where a clean cover system requirement has been identified have been calculated at an area of 1,255m². It considered that 600mm Subsoil will be installed within garden areas to complete the clean cover system. Therefore, 753m³ of Subsoil will be required for reuse on the site.	753m³ Fill (Garden- North)	753m³ Shortfall Re-use 546m³ from Drainage Arisings (MM17) dependent upon the suitability of the materials. Re-use 207m³ from Foundation Arisings (MM18) dependent upon the suitability of the materials.
MM16	***Reuse of Site Won Subsoil in POS/Landscaping (North Only where a clean cover system is required).*** POS and Landscaping areas in the north of the site where a clean cover system requirement has been identified have been calculated at an area of 2,389m². It considered that 450mm Subsoil will be installed within POS/Landscaping to complete the clean cover system. Therefore, 1,075m³ of Subsoil is required for reuse on the site.	1,075m³ Fill (Garden- North)	1,075m³ Shortfall Re-use 1,075m³ from Foundation Arisings (MM18) dependent upon the suitability of the materials.
MM17	***Plot Drainage & Service Excavations*** It is estimated that circa 4,042m³ of spoil will be generated from the development associated with the construction of plot drainage and service infrastructure. At present, no detailed drainage levels have been provided to ERGO for the site. The model should be updated following detailed design in this area. Currently, estimations have been completed by site size and average drainage calculations.	4,042m³ (Cut)	4,042m³ Excess Re-use 2,359m³ in Gardens/ POS South (MM9) Re-use 1,137m³ in Subsoil in Gardens/ POS South (MM14) Re-use 546m³ in Subsoil in Gardens - North (MM15)
MM18	***Foundation Excavation Arising's*** ERGO has estimated the proposed depth of the structural foundation below EWL on shallow strip/ mass trench plots to inform an assessment of the spoil arising from excavation works assuming plots are to be left at 500mm below FFL. It is estimated that circa 1,544m³ of spoil will be generated. The arisings from pile formation have not been included within this assessment.	1,544m³ (Cut)	1,544m³ Excess Re-use 207m³ in Subsoil in Gardens - North (MM15) Re-use 1,075m³ in Subsoil in POS/Landscaping North (MM16) 262m³ Excess
MM19	***General Bulking of Cut Material*** Where material is cut, it will generally bulk to 110% of the original volume and as such an additional 1,100m³ of material will be generated from site operations. (Excluding MM1, MM2 & MM3).	1,100m³ (Cut)	1,100m³ Excess

Summary of Material Movement

Materials to be Crushed/ Potentially Reused within build-up of roads/ driveways/ pile mats/ etc.	
Estimated Concrete Volume from Buildings (MM1)*	1,077m³
Estimated Hardstanding Volume of Concrete and Tarmac (MM2)*	2,268m³
Excess General Subsoil/Made Ground	
General Fill Material Excess	1,362m³
Import of Topsoil	
Topsoil to Import	1,683m³

GENERAL GEOTECHNICAL NOTES

All material that is to be replaced (filled) must be placed in strict accordance with the ERGO Materials Management Specification and the MCHW600. Where any uncertainty remains regarding the material type classification, clarification should be sought from ERGO to confirm compaction specification requirements.

ERGO would note that additional excess clay soils could be generated through disturbance of the shallow formation layers by the roads and sewer contractor and as such their works should be monitored closely.

If materials arisings from foundations, drainage arisings and any other deeper excavations do not generate enough clean natural materials, clean subsoils may require importation to site to complete the clean cover systems in soft landscaping areas.

Removal of tanks and other subterranean features noted within the site investigations may impact the volumes and could result in a reduction in excess soils.

* No crushing factor has been included within this calculation.

Summary of Site Strip

Groups	Depths (mm)	Volumes (m³)			Areas (m²)		
		Cut (Material)	Fill (Void)	Balance	Cut	Fill	Total
Buildings (to be demolished)	350mm	1077.2920	0.0000	1077.2920	3077.9770	0.0000	3077.9770
Hardstanding (Concrete and Tarmac)	150mm	2268.3699	0.0000	2268.3699	15122.4660	0.0000	15122.4660
Surface Made Ground	200mm	2194.8008	0.0000	2194.8008	10974.0040	0.0000	10974.0040
Total		5540.4627	0.0000	**5540.4627**	29174.4470	0.0000	29174.4470

Summary of Material Movement to Reduced Level Dig

Groups	Depths	Volumes (m³)			Areas (m²)		
		Cut (Material)	Fill (Void)	Balance	Cut	Fill	Total
Plots - Piled	750mm	1300.6300	-506.1820	794.4480	1326.5550	1906.8850	3233.4400
Plots - SS & MT	500mm	264.5410	-3285.1100	-3020.5690	532.1090	4600.9730	5133.0820
Driveways/ Car Parking	435mm	228.9060	-1036.6900	-807.7840	1020.1370	1278.0540	2298.1910
Roadways	770mm	857.3590	-478.1680	379.1910	2244.2870	1611.7520	3856.0390
Footpaths	300mm	209.1900	-904.8600	-695.6700	502.3590	1614.5200	2116.8790
Garden / POS & Landscaping (South)	300mm	651.6880	-3651.6390	-2999.9510	1813.8330	5764.8060	7578.6390
Gardens (North)	750mm	129.1700	-62.4760	66.6940	608.9000	645.6990	1254.5990
POS / Landscaping (North)	600mm	776.4880	-203.6500	572.8380	1458.2880	930.4100	2388.6980
SUDS	As per drawings	1000.2830	-63.4260	936.8570	1078.8540	236.0260	1314.8800
Total		5418.2550	-10192.2010	**-4773.9460**	10585.3220	18589.1250	**29174.4470**

Volumetrics

🟥	Plots - Piled	🟩	Gardens / POS & Landscaping - (South with no Clean Cover System)
🟧	Plots - SS & MT	🟩	Gardens (North with Clean Cover System)
⬜	Driveway/ Car Parking	🟩	POS / Landscaping (North with Clean Cover System)
⬛	Roadways	🟦	SUDS
🟨	Footpaths	🟥	Area not included within model

Notes:

The assessment of foundation spoil has been assumed in due consideration of the foundation recommendations detailed in the Gravity Consulting Engineers Preliminary Foundation Appraisal drawing ref: W2115_GSK-001 (undated).

The Premier Energy Site Investigation ref: 603531, dated October 2022 and the Geo-Environmental Ground Appraisal Report reference GE18721-GARv5.0-JAN23, dated January 2023 record the site surface materials to be variable comprising Made Ground, hardstanding of concrete and tarmac, and buildings with assumed concrete floor slabs. Based on the exploratory hole information provided, the site strip has been modelled as average thicknesses of surface Made Ground of 200mm, areas of hardstanding at an average thickness of 150mm and average strip beneath buildings of 350mm.

Proposed levels have been provided from Ardent Consulting Engineers Drawings ref: 2207820-006 Draft Issue, dated January 2023.

ERGO have not been provided with a detailed Drainage Strategy for the site. The model should be updated following detailed design.

Topographical information has been provided by D & H Surveys ref: CAD File METIS-Midhurst-Brickworks-Final, dated: December 2018. Several stockpiles of unknown materials are noted on the topo which have been included within the assessment.

If materials arisings from foundations, drainage arisings and any other deeper excavations do not generate enough clean/suitable natural materials, clean subsoils may require importation to site to complete the clean cover systems in soft landscaping areas. This could also increase the excess of Made Ground materials on site.

Phase	Issue	Date	Drawn	Checked
P1	-	07.03.2023	KF	JN

Client:
Bellway
South London

Job Title:
Midhurst, Bepton
Road, West Sussex

Job No: 23-1518

Date: 07.03.2023

Drawing No: 001

Scale: NTS

Drawing Title:
Preliminary Indicative
Volumetrics Plan

ERGO

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ERGO SOILS MANAGEMENT PLAN – MIDHURST, BEPTON ROAD

ERGO has prepared this soils management plan as a guide to the efficient handling of soil materials, with respect to the anticipated volumes of spoil that will be generated by the general cut / fill of the site to Enabling Works Levels (EWL) and from civil engineering works. In the preparation of this SMP, ERGO has undertaken a 3D volumetric assessment of the proposed cut / fill operations using the original topographical survey as a base point and working to the assumed formation levels (as outlined below and agreed with the client).

ERGO has also undertaken a volumetric assessment of the soil that will arise as part of the construction of the highways, drainage infrastructure and plot foundations. For the purposes of this assessment and in consideration of the standard construction requirements, ERGO has produced a cut / fill volumetric assessment to achieve the following Enabling Works Levels (EWL) from the Finished Floor Levels (FFL) or Finished Ground Levels (FGL):

- Building Footprint (Piled) – 750mm below FFL
- Building Footprint (Shallow Strip & Mass Trench) – 500mm below FFL
- Driveways / Car Parking – 435mm below FGL
- Roadways – 770mm below FGL
- Footpaths – 300mm below FGL
- Garden / POS & Landscaping in South – 300mm below FGL
- Gardens (North) 750mm below FGL
- POS / Landscaping (North) – 600mm below FGL
- SUDS – As per the provided drawings

The proposed earthworks operations as outlined below are for indicative purposes and have been prepared in due consideration of the anticipated estimated materials volumes and likely construction phasing. The assessment of foundation spoil has been assumed in due consideration of the foundation recommendations detailed in the Gravity Consulting Engineers Preliminary Foundation Appraisal drawing ref: W2115_GSK-001 (undated).

The Premier Energy Site Investigation ref: 603531, dated October 2022 and the Geo-Environmental Ground Appraisal Report reference GE18721-GARv5.0-JAN23, dated January 2023 record the site surface materials to be variable comprising Made Ground, hardstanding of concrete and tarmac, and buildings with assumed concrete floor slabs. Based on the exploratory hole information provided, the site strip has been modelled as average thicknesses of surface Made Ground of 200mm, areas of hardstanding at an average thickness of 150mm and average strip beneath buildings of 350mm.

Proposed levels have been provided from Ardent Consulting Engineers Drawings ref: 2207820-006 Draft Issue, dated January 2023.

ERGO have not been provided with a detailed Drainage Strategy for the site. The model should be updated following detailed design.

Topographical information has been provided by D & H Surveys ref: CAD File METIS-Midhurst-Brickworks-Final, dated: December 2018. Several stockpiles of unknown materials are noted on the topo which have been included within the assessment.

If materials arisings from foundations, drainage arisings and any other deeper excavations do not generate enough clean/suitable natural materials, clean subsoils may require importation to site to complete the clean cover systems in soft landscaping areas. This could also increase the excess of Made Ground materials on site.

The Isopachyte Cut / Fill drawing details the depths of cut / fill to achieve the Enabling Works Levels (EWL) prescribed above (Drawing 23-1518-002). This assessment has been prepared in due consideration of the proposed development with an overarching assessment of Cut / Fill works included within ERGO Drawing (23-1518-001).

MM1	***Site Strip from Building Areas Arisings – estimated thickness of concrete slabs*** Current estimated areas of site where buildings are noted equates to a total area of 3,078m² with a preliminary estimated thickness of 350mm. A volume of circa 1,077m³ has been estimated for the concrete slabs in this area, however this should be confirmed following demolition. It is assumed that concrete will be crushed and reused within the build-up/ subbase for roads/ driveways/ pile mats/ etc.	1,077m³ (Cut)	1,077m³ Excess* *To be used as crush material pending suitability
MM2	***Site Strip of Hardstanding Areas– estimated thickness of concrete and tarmac materials*** Current estimated hardstanding areas on the site equates to a total area of 15,122m² with a preliminary estimated thickness of 150mm. A volume of circa 2,268m³ has been estimated for hardstanding on site, however this includes both concrete and tarmac materials. It is assumed that concrete will be crushed and reused within the build-up/ subbase for roads/ driveways/ pile mats/ etc. It has been assumed that tarmac does not contain significant coal tar and would be permitted for reuse- this should be confirmed.	2,268m³ (Cut)	2,268m³ Excess* *To be used as crush material pending suitability
MM3	***Site Strip of Surface Made Ground*** Current estimated Made Ground of the site equates to a total volume of circa 2,195m³ for an estimated average thickness of 200mm over an area of 10,974m². Where material is cut, it has been assumed that it will generally bulk to 110% of the original volume and as such an approximate additional 220m³ of material will be generated from site operations. A total Made Ground volume of 2,415m³ has been estimated for the site (this includes bulking). The material types are varied across the site and it should be noted Made Ground is noted to extend deeper on site than the depth of the site strip which has been modelled.	2,415m³ (Cut - Including Bulking)	2,415m³ Excess Re-use 2,415m³ in Plots – SS & MT (MM5) pending suitability of materials
MM4	***Cut & Fill Plots (Piled) to 750mm below FGL*** A total Cut of 1,301m³ will be generated from excavations to Piled plots to achieve 750mm below plot FFL. A total Fill of 506m³ is required to achieve 750mm below Piled plot FFL. An Excess of 795m³ has been estimated.	1,301m³ (Cut) & 506m³ (Fill)	795m³ Excess Re-use 605m³ in Plots – SS & MT (MM5) Re-use 190m³ in Driveways (MM6)
MM5	***Cut & Fill Plots (SS & MT)) to 500mm below FGL*** A total Cut of 265m³ will be generated from excavations to SS/MT Plots to achieve 500mm below plot FFL. A total Fill of 3,285m³ is required to achieve 500mm below SS/MT plot FFL. A Shortfall of 3,020m³ has been estimated.	265m³ (Cut) & 3,285m³ (Fill)	3,020m³ Shortfall Re-use 2,415m³ from Surface Made Ground (MM3) pending suitability Re-use 605m³ from Plots - Piled (MM4)
MM6	***Cut & Fill Driveways to 435mm below FGL*** A total Cut of 229m³ will be generated from cutting driveways to 435mm below FGL. A total Fill of 1,037m³ of material is required to fill driveways to a minimum level of 435mm below FGL. A Shortfall of 808m³ has been estimated.	229m³ (Cut) & 1,037m³ (Fill)	808m³ Shortfall Re-use 190m³ from Plots - Piled (MM4) Re-use 379m³ from Roadways (MM7) Re-use 67m³ from Gardens – North (MM10) Re-use 172m³ from POS/ Landscaping – North (MM11)
MM7	***Cut & Fill Roadways to 770mm below FGL*** A total Cut of 857m³ will be generated from cutting roadways to 770mm below FGL. A total Fill of 478m³ of material is required to fill roadways to a minimum level of 770mm below FGL. An Excess of 379m³ has been estimated.	857m³ (Cut) & 478m³ (Fill)	379m³ Excess Re-use 379m³ in Driveways (MM6)
MM8	***Cut & Fill Footpaths to 300mm below FGL*** A total Cut of 209m³ will be generated from cutting footpaths to 300mm below FGL. A total Fill of 905m³ of material is required to fill footpaths to a minimum level of 300mm below FGL. A Shortfall of 696m³ has been estimated.	209m³ (Cut) & 905m³ (Fill)	696m³ Shortfall Re-use 400m³ from POS/ Landscaping – North (MM11) Re-use 296m³ from SUDS (MM12)
MM9	***Cut & Fill Gardens / POS / Landscaping (South where no Clean Cover is modelled) to 300mm below FGL*** A total Cut of 652m³ will be generated by reducing gardens / POS / landscaping (South) to 300mm below FGL. A total Fill of 3,652m³ is required to achieve 300mm below garden / POS / landscaping (South) FGL. A Shortfall of 3,000m³ has been estimated.	652m³ (Cut) & 3,652m³ (Fill)	3,000m³ Shortfall Re-use 641m³ from SUDS (MM12) Re-use 2,359m³ from Drainage Arisings (MM17)
MM10	***Cut & Fill Gardens (North where Clean Cover System is Required) to 750mm below FGL*** A total Cut of 129m³ will be generated by reducing gardens (North) to 750mm below FGL. A total Fill of 62m³ is required to achieve 750mm below garden (North) FGL. An Excess of 67m³ has been estimated.	129m³ (Cut) & 62m³ (Fill)	67m³ Excess Re-use 67m³ in Driveways (MM6)
MM11	***Cut & Fill Public Open Space / Landscaping (North where Clean Cover is Required) to 600mm below FGL*** A total Cut of 776m³ will be generated by reducing POS/ landscaping (North) to 600mm below FGL. A total Fill of 204m³ is required to achieve 450mm below POS/ landscaping (North) FGL. An Excess of 572m³ has been estimated.	776m³ (Cut) & 204m³ (Fill)	572m³ Excess Re-use 172m³ in Driveways (MM6) Re-use 400m³ in Footpaths (MM8)
MM12	***Cut & Fill SUDS to levels recorded on drawings.*** A total Cut of 1,000m³ will be generated by reducing the SUDS areas to levels recorded on drawings. A total Fill of 63m³ is required to achieve the levels recorded on the drawings for the SUDS. An Excess of 937m³ has been estimated.	1,000m³ (Cut) & 63m³ (Fill)	937m³ Excess Re-use 296m³ in Footpaths (MM8) Re-use 641m³ in Gardens/ POS South (MM9)
MM13	***Reuse of Site Won Topsoil in Private Gardens & Public Open Space/ Landscaping (North & South).*** Residential garden and landscaped/ POS areas have been calculated at an area of 11,222m². It considered that 150mm topsoil will be installed within garden areas and landscaping/ POS areas to provide a growing medium. Therefore, 1,683m³ of clean/suitable topsoil will be required on the site.	1,683m³ Fill	1,683m³ Clean Suitable Topsoil to Import
MM14	***Reuse of Site Won Subsoil in Private Gardens & Public Open Space/ Landscaping (South Only where no cover system is modelled).*** Residential gardens, POS and landscaping areas in the south of the site where no cover system has been identified have been calculated at an area of 7,579m². It considered that 150mm Subsoil will be installed within garden areas to provide the required growing medium. Therefore, 1,137m³ of Subsoil will be required for reuse on the site dependent upon suitability of materials.	1,137m³ Fill (Gardens /POS/ Landscaping- South)	1,137m³ Shortfall Re-use 1,137m³ from Drainage Arisings (MM17) dependent upon the suitability of the materials.
MM15	***Reuse of Site Won Subsoil in Private Gardens (North Only where a clean cover system is required).*** Residential garden areas in the north where a clean cover system requirement has been identified have been calculated at an area of 1,255m². It considered that 600mm Subsoil will be installed within garden areas to complete the clean cover system. Therefore, 753m³ of Subsoil will be required for reuse on the site.	753m³ Fill (Garden- North)	753m³ Shortfall Re-use 546m³ from Drainage Arisings (MM17) dependent upon the suitability of the materials. Re-use 207m³ from Foundation Arisings (MM18) dependent upon the suitability of the materials.
MM16	***Reuse of Site Won Subsoil in POS/Landscaping (North Only where a clean cover system is required).*** POS and Landscaping areas in the north of the site where a clean cover system requirement has been identified have been calculated at an area of 2,389m². It considered that 450mm Subsoil will be installed within POS/Landscaping to complete the clean cover system. Therefore, 1,075m³ of Subsoil will be required for reuse on the site.	1,075m³ Fill (Garden- North)	1,075m³ Shortfall Re-use 1,075m³ from Foundation Arisings (MM18) dependent upon the suitability of the materials.
MM17	***Plot Drainage & Service Excavations*** It is estimated that circa 4,042m³ of spoil will be generated from the development associated with the construction of plot drainage and service infrastructure. At present, no detailed drainage levels have been provided to ERGO for the site. The model should be updated following detailed design in this area. Currently, estimations have been completed by site size and average drainage calculations.	4,042m³ (Cut)	4,042m³ Excess Re-use 2,359m³ in Gardens/POS South (MM9) Re-use 1,137m³ in Subsoil in Gardens/POS South (MM14) Re-use 546m³ in Subsoil in Gardens - North (MM15)
MM18	***Foundation Excavation Arising's*** ERGO has estimated the proposed depth of the structural foundation below EWL on shallow strip/ mass trench plots to inform an assessment of the spoil arising from excavation works assuming plots are to be left at 500mm below FFL. It is estimated that circa 1,544m³ of spoil will be generated. The arisings from pile formation have not been included within this assessment.	1,544m³ (Cut)	1,544m³ Excess Re-use 207m³ in Subsoil in Gardens - North (MM15) Re-use 1,075m³ in Subsoil in POS/Landscaping North (MM16) 262m³ Excess
MM19	***General Bulking of Cut Material*** Where material is cut, it will generally bulk to 110% of the original volume and as such an additional 1,100m³ of material will be generated from site operations. (Excluding MM1, MM2 & MM3).	1,100m³ (Cut)	1,100m³ Excess

Summary of Material Movement	
Materials to be Crushed/ Potentially Reused within build-up of roads/ driveways/ pile mats/ etc.	
Estimated Concrete Volume from Buildings (MM1)*	**1,077m³**
Estimated Hardstanding Volume of Concrete and Tarmac (MM2)*	**2,268m³**
Excess General Subsoil/Made Ground	
General Material Excess (Subsoils/ Made Ground/ Excess Stockpiles)**	**1,362m³**
Import of Topsoil	
Topsoil to Import	**1,683m³**

GENERAL GEOTECHNICAL NOTES

All material that is to be replaced (filled) must be placed in strict accordance with the ERGO Materials Management Specification and the MCHW 600. Where any uncertainty remains regarding the material type classification, clarification should be sought from ERGO to confirm compaction specification requirements.

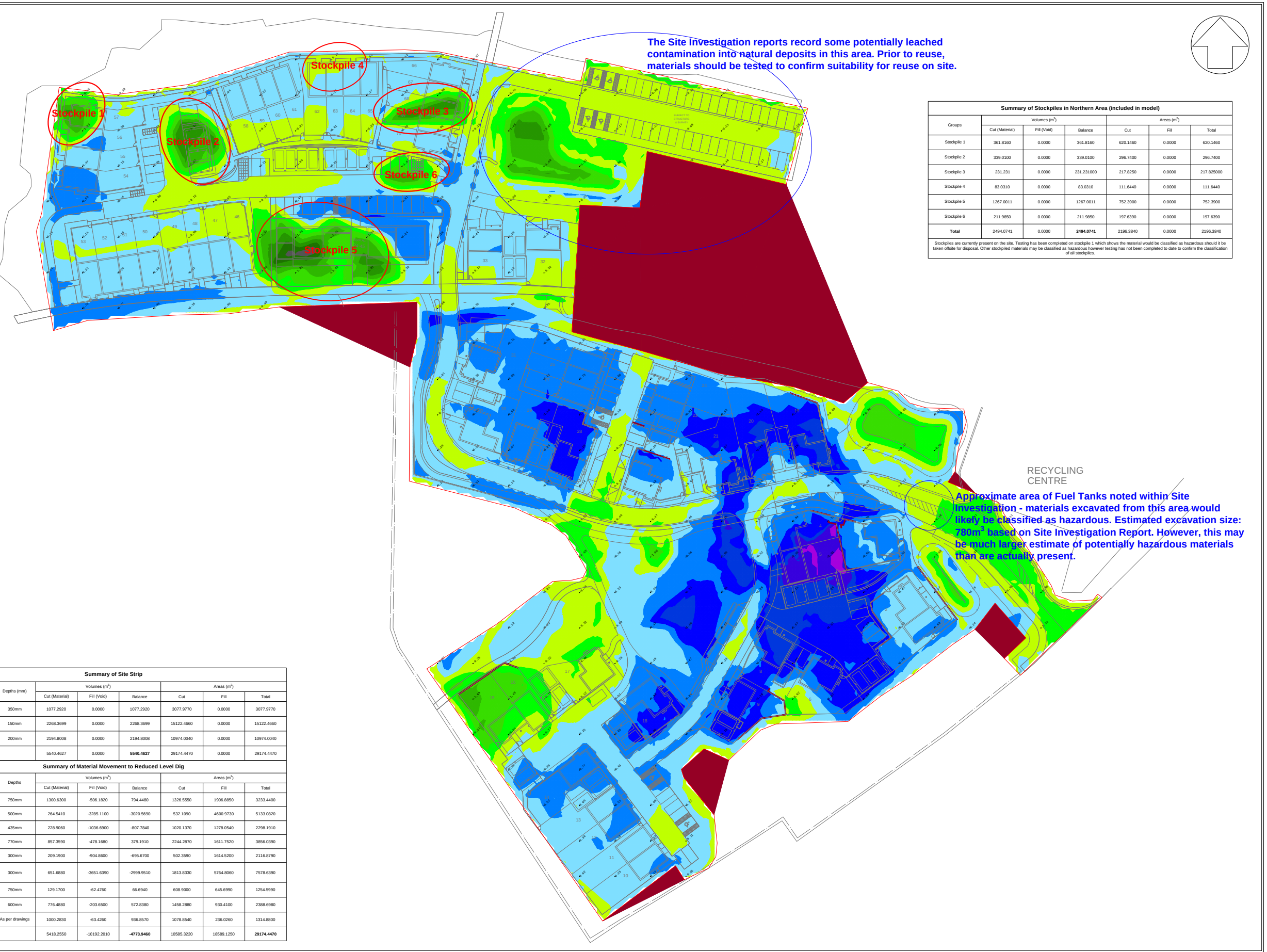
ERGO would note that additional excess clay soils could be generated through disturbance of the shallow formation layers by the roads and sewer contractor and as such their works should be monitored closely.

If materials arisings from foundations, drainage arisings and any other deeper excavations do not generate enough clean natural materials, clean subsoils may require importation to site to complete the clean cover systems in soft landscaping areas.

Removal of tanks and other subterranean features noted within the site investigations may impact the volumes and could result in a reduction in excess soils.

* No crushing factor has been included within this calculation.

**Stockpile 1 has been identified as hazardous waste –should this material be taken offsite additional charges will apply due to the hazardous nature of the materials. Other stockpiles may also be classes as hazardous following testing.



The Site Investigation reports record some potentially leached contamination into natural deposits in this area. Prior to reuse, materials should be tested to confirm suitability for reuse on site.

Approximate area of Fuel Tanks noted within Site Investigation - materials excavated from this area would likely be classified as hazardous. Estimated excavation size: 780m³ based on Site Investigation Report. However, this may be much larger estimate of potentially hazardous materials than are actually present.

Summary of Stockpiles in Northern Area (included in model)						
Groups	Volumes (m³)			Areas (m²)		
	Cut (Material)	Fill (Void)	Balance	Cut	Fill	Total
Stockpile 1	361.8160	0.0000	361.8160	620.1460	0.0000	620.1460
Stockpile 2	339.0100	0.0000	339.0100	296.7400	0.0000	296.7400
Stockpile 3	231.231	0.0000	231.231000	217.8250	0.0000	217.825000
Stockpile 4	83.0310	0.0000	83.0310	111.6440	0.0000	111.6440
Stockpile 5	1267.0011	0.0000	1267.0011	752.3900	0.0000	752.3900
Stockpile 6	211.9850	0.0000	211.9850	197.6390	0.0000	197.6390
Total	2494.0741	0.0000	**2494.0741**	2196.3840	0.0000	2196.3840

Stockpiles are currently present on the site. Testing has been completed on stockpile 1 which shows the material would be classified as hazardous should it be taken offsite for disposal. Other stockpiled materials may be classified as hazardous however testing has not been completed to date to confirm the classification of all stockpiles.

Summary of Site Strip							
Groups	Depths (mm)	Volumes (m³)			Areas (m²)		
		Cut (Material)	Fill (Void)	Balance	Cut	Fill	Total
Buildings (to be demolished)	350mm	1077.2920	0.0000	1077.2920	3077.9770	0.0000	3077.9770
Hardstanding (Concrete and Tarmac)	150mm	2268.3699	0.0000	2268.3699	15122.4660	0.0000	15122.4660
Surface Made Ground	200mm	2194.8008	0.0000	2194.8008	10974.0040	0.0000	10974.0040
Total		5540.4627	0.0000	**5540.4627**	29174.4470	0.0000	29174.4470

Summary of Material Movement to Reduced Level Dig							
Groups	Depths	Volumes (m³)			Areas (m²)		
		Cut (Material)	Fill (Void)	Balance	Cut	Fill	Total
Plots - Piled	750mm	1300.6300	-506.1820	794.4480	1326.5550	1906.8850	3233.4400
Plots - SS & MT	500mm	264.5410	-3285.1100	-3020.5690	532.1090	4600.9730	5133.0820
Driveways/ Car Park	435mm	228.9060	-1036.6900	-807.7840	1020.1370	1278.0540	2298.1910
Roadways	770mm	857.3590	-478.1680	379.1910	2244.2870	1611.7520	3856.0390
Footpaths	300mm	209.1900	-904.8600	-695.6700	502.3590	1614.5200	2116.8790
Garden / POS & Landscaping (South)	300mm	651.6880	-3651.6390	-2999.9510	1813.8330	5764.8060	7578.6390
Gardens (North)	750mm	129.1700	-62.4760	66.6940	608.9000	645.6990	1254.5990
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SUDS	As per drawings	1000.2830	-63.4260	936.8570	1078.8540	236.0260	1314.8800
Total		5418.2550	-10192.2010	**-4773.9460**	10585.3220	18589.1250	**29174.4470**

Volumetrics

🟪	>3.00m (Fill)	🟩	0.00 - 0.49m (Cut)
🟪	2.50 - 2.99m (Fill)	🟩	0.50 - 0.99m (Cut)
🟦	2.00 - 2.49m (Fill)	🟩	1.00 - 1.49m (Cut)
🟦	1.50 - 1.99m (Fill)	🟩	1.50 - 1.99m (Cut)
🟦	1.00 - 1.49m (Fill)	🟩	2.00 - 2.49m (Cut)
🟦	0.50 - 0.99m (Fill)	🟩	2.50 - 2.99m (Cut)
🟦	0.00 - 0.49m (Fill)	⬛	>3.00m (Cut)
		🟥	Area not included within model

Notes:

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P1	-	07.03.2023	KF	JN
Phase	Issue	Date	Drawn	Checked

Client:
Bellway
South London

Job No: 23-1518

Date: 07.03.2023

Drawing No: 002

Scale: NTS

Job Title:
Midhurst, Bepton Road, West Sussex

Drawing Title:
Preliminary Indicative Isopachyte Plan

ERGO

Notes:

All contractors must visit the site and be responsible for taking and checking Dimensions.
All construction information should be taken from figured dimensions only.
Any discrepancies between drawings, specifications and site conditions must be brought to the attention of the supervising officer.
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Key

◌	Root Protection Area
▨	BCP
═	Existing Retaining wall
V*	Visitor spaces to be made available for use by operatives of the recycling centre during its operating hours

Rev	Date	Description	Drawn	Chkd
P6	01.08.22	Planning Resubmission	CI	ABL
P5	14.04.22	Planning Resubmission	CI	ABL
P4	26.11.21	Planning Resubmission	CI	DEC
P3	28.09.21	Planning Resubmission	CI	DEC
P2	25.06.21	Planning Resubmission	CI	DEC
P1	04.11.20	Planning Submission	CI	DEC

Drawing Status
PLANNING

Client
METIS HOMES

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Project
MIDHURST BRICKWORKS

Drawing Title
Proposed Layout

Scale @ A1 1:500
Job Ref. 01486
Drawing No. 01486 _ MP_01
Revision P6
Scale Bar 0 5 10 15 20 25m

Notes:

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Key

Rev	Date	Description	Drawn	Chkd
P6	01.08.22	Planning Resubmission	MK	CI
P5	14.04.22	Planning Resubmission	FZ	CI
P3	27.09.21	Planning Resubmission	FZ	DEC
P2	25.06.21	Resubmission	LAB	CI
P1	04.11.20	Planning Submission	SKS/DJF	DEC/CI

Drawing Status
PLANNING

Client
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Project
MIDHURST BRICKWORKS

Drawing Title
Illustrative Site Plan

Scale @ A1 1:500
Job Ref. 01486
Drawing No. 01486 _ MP_02
Revision P6
Scale Bar
0 5 10 15 20 25m

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- Topographic Surveys
- Elevation Surveys
- Floor Plan Surveys
- Volumetric Surveys
- As Built Drainage Surveys
- Site Setting Out
- Co-ordination Of Site Layouts
- Rectified Photo Elevations
- C.A.D Plotting Bureau

Project Name:
Brickworks Site
Midhurst

Drawing Title:
Topographic Survey

Client:
Metis Homes
Agent:

Date: Dec 2018		Scale: A0 @ 1:250	
Drawn	Surveyor	Dwg No	Revision
KJH	GH	SHEET 1	
Site Datum Ordnance Survey		OSBM Reference SF 1.000 Localised OS15	
Grid Orientation Ordnance Survey		Sheet ID METIS-Midhurst-Brickworks	

Disclaimer
D & H Surveys will Guarantee that this Survey Data is Correct to the Indicated Scale only.

D&H Surveys

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Metis Homes
Agent:

Date: Dec 2018		Scale: A0 @ 1:250	
Drawn KJH	Surveyor GH	Dwg No SHEET 2	Revision
Site Datum Ordnance Survey		OSBM Reference SF 1.000 Localised OS15	
Grid Orientation Ordnance Survey		Sheet ID METIS-Midhurst-Brickworks	

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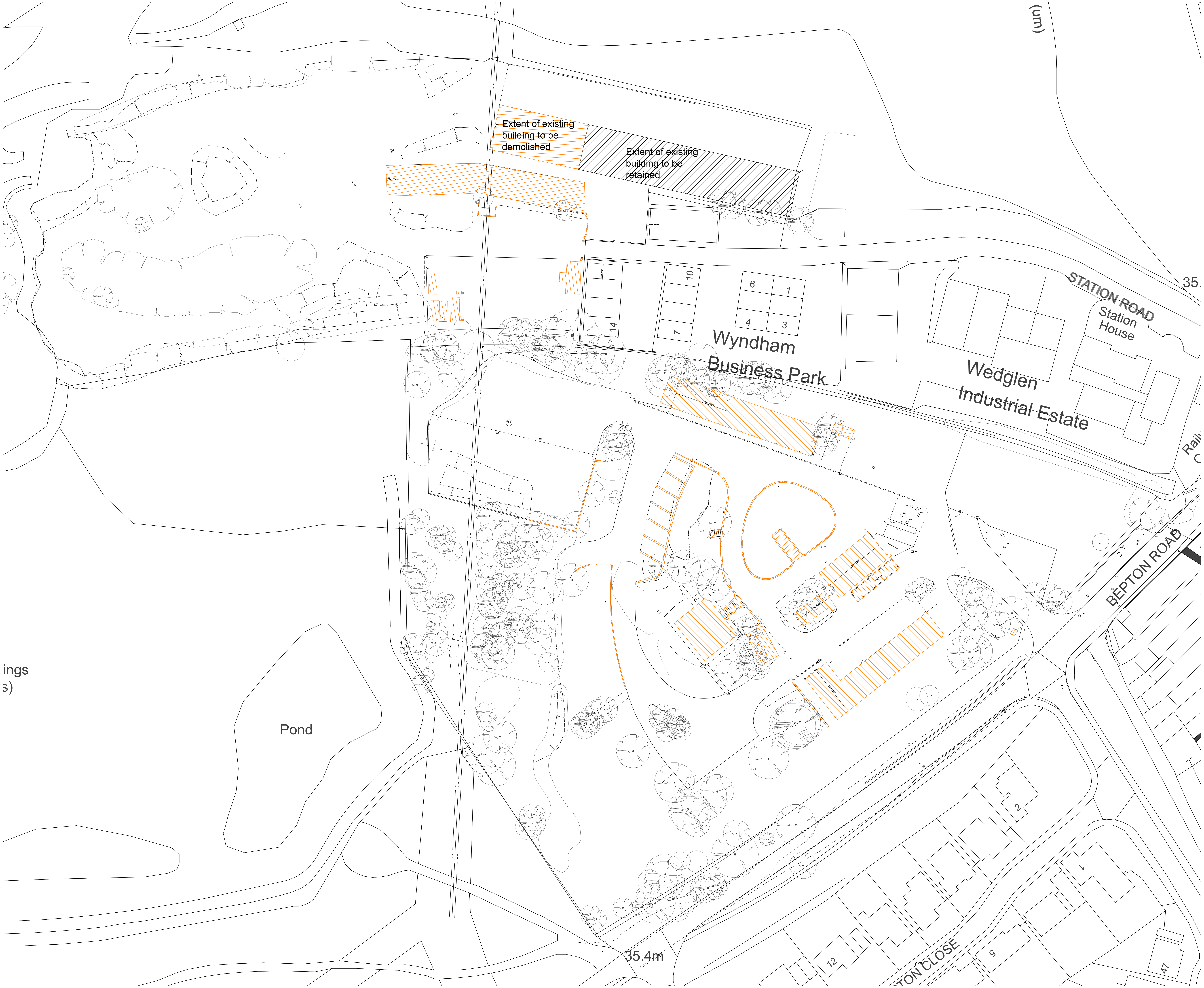

Notes:
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Key

▨	EXISTING - TO BE DEMOLISHED
▨	EXISTING BUILDINGS TO BE RETAINED *SUBJECT TO STRUCTURE AND SURVEY

Rev	Date	Description	Drawn	Chkd
P2	25.06.21	Planning Resubmission	SKS	CI
P1	04.11.20	Planning Submission	SKS	CI

Drawing Status
PLANNING

Client
METIS HOMES

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Project
MIDHURST BRICKWORKS

Drawing Title
Demolition Plan

Scale @ A1 1:500
Job Ref. 01486
Drawing No. 01486 _ S_02
Revision P2
Scale Bar
0 5 10 15 20 25m

Appendix B Contamination Discovery Strategy

Contamination Discovery Strategy: Procedure

1 General

1.1 With the development of any site, there is a residual risk of contamination being found that is unexpected or has not previously been identified.

1.2 As a precaution, the Principal Contractor should adopt this Discovery Strategy for dealing with unexpected contamination or encountering underground storage tanks.

1.3 The Principal Contractor should also ensure it is distributed and communicated appropriately to all relevant ground workers.

2 Step 1: Halting Works & Consultant Notification

2.1 Should any previously unidentified contamination be encountered, works should be made safe then temporarily halted in the affected area, and Soiltechnics (The Consultant) informed within 24hrs.

2.2 If, due to site constraints, the contaminated materials need to be excavated prior to being assessed, the Contactor should segregate the material as best as is reasonably practicable, based upon visual and olfactory observations. The contaminated materials should then be stockpiled on an impermeable surface and covered with impermeable sheeting.

3 Step 2: Initial Assessment & Regulatory Notification

3.1 The Consultant must liaise with the contractor and undertake an initial assessment within 48 hours of notification to determine if the event qualifies as ‘potentially significant unexpected contamination”.

3.2 Where the initial assessment does not consider the contamination to be potentially significant and unexpected, works can recommence.

3.3 The Planning Authority and Pollution Regulatory Team must be contacted within 2 working days if the contamination poses a significant risk to health.

4 Step 3: Contamination Assessment and Remedial Strategy

4.1 Where potentially significant unexpected contamination is confirmed, the Consultant must produce a Discovery Event Report which includes a description and risk assessment of the contamination.

4.2 A phase of intrusive investigation works may be required to inform the risk assessment.

4.3 Where remediation is required, the report must include a remedial and verification strategy..

4.4 Within 24 hours of completion, the Discovery Event Report must be provided to the Local Authority for their approval, and a copy held for appending to the project Verification Report.

5 Step 4: Recommencement and Implementation

5.1 Works can only recommence upon specific instruction from the Consultant and once the Discovery Event Report has been submitted to the Local Authority.

5.2 All remedial works must be implemented and verified in full. The event-specific Verification Report (if required) must be submitted to the Local Authority for approval.

Contamination Discovery Strategy: Contractor Site Guide

Discovery Event

- Previously unidentified contamination is encountered.
- This inculdes encountering underground storage tanks (UST).

Halt Works in Area

- Make the area safe.
- Halt works in the affected area.
- Stockpile any contaminated arisings on an impermeable surface and cover with impermeable sheeting.
- Works to recommence only upon instruction from the Consultant (Soiltechnics Ltd).

Inform the Consultant

- Contact Soiltechnics (the Consultant) within 24 hours.
- Tel: 01604 781 877
- E-mail: enquiries@soiltechnics.net

Assessment

- An initial assessment must be carried out by Soiltechnics to determine the appropraite course of action.
- A detailed assessment and a sampling exercise may be required.
- Approval from the Local Authority may be required.

Remediation

- Remedial work may be required.
- In some instances, remediation will have to be completed before works in the area can recommence. In this case, the Local Authority will require submission and approval of a Verification Report prior to recommencement.

Appendix C Underground Storage Tank Removal Strategy

Encountering & Decommissioning of Underground Storage Tanks

1 General

1.1 The following expands on the general procedures outlined within the Contamination Discovery Strategy and Remediation Strategy to provide a detailed process that must be followed in the event of encountering an underground storage tank (UST).

1.2 Any UST encountered and associated pipework shall be decommissioned and removed from site following the current guidance within the APEA document "Design, Construction, Modification, Maintenance And Decommissioning Of Petrol Filling Stations", April 2015.

1.3 The purpose of this report is to provide a Remediation Strategy for the site contractors and Consultant to work to in the event of encountering underground storage tanks.

2 Step 1: Halting Works

2.1 Should any USTs be encountered, works should be made safe then temporarily halted. A tank decommissioning specialist and Soiltechnics (The Consultant) should be informed within 24hrs. Efforts should be made, under the guidance of the specialist, to inspect and confirm the contents of the tank and identify any special precautions which may be required.

3 Step 2: Bottoming

3.1 Before the removal of a UST, all residual fuel/oil should be removed from the tank, so far as is reasonably practicable. This is referred to as 'bottoming' and should be carried out by a specialist contractor.

3.2 Where present, pipework carrying fuel should be drained back to the tank before bottoming takes place.

4 Step 3: Inerting

4.1 Due to the potential for explosive atmospheres to be present, any tanks containing flammable substances, such as petrol or solvents, should be 'inerted' prior to excavation. Where tanks contain substances with a low flashpoint, inerting is not required.

4.2 Inerting operations can include filling with gases or cleaning and de-gassing followed by carrying out oxygen testing, or the filling of the tank with water or foam.

4.3 The operation should be carried out by a specialist and a certificate provided ensuring the tank is safe to remove.

5 Step 4: Pipework Removal

5.1 All pipework connected to the tank should, as far as is reasonably practicable, be removed.

5.2 The removal of pipework should not be carried out until it has been drained and isolated from fuel sources.

5.3 Residual fuels may be present in pipework and a precautionary measure of flushing with water should precede the removal and dismantling work.

5.4 Care should be taken to ensure that no fuel or contaminated water is allowed to enter any drainage system, watercourse or the ground. Water used to flush out the pipework should be collected for safe disposal. It may be possible, with appropriate approval, to discharge this water through the on-site oil/water separator.

6 Step 5: Tank Lifting and Excavation Works

6.1 Prior to lifting a tank from an excavation, a risk assessment should be prepared by the specialist contractor responsible for the works.

6.2 During the excavation and removal of a UST it should be assumed that contaminated soils are likely to be encountered in the area immediately surrounding the underground tank and pipework. Excavations should continue until all grossly contaminated soils have been removed. The sides and the base of the excavation must then be sampled by a Geoenvironmental consultant to verify the satisfactory removal of contaminated soils.

7 Step 6: Dismantling and Disposal

7.1 Uplifted redundant tanks may be broken up on-site prior to disposal, providing such works can be undertaken without endangering workers of the environment.

7.2 To minimise the risk of fire or explosion, cold cutting techniques should be used.

8 Watching Brief and 3rd Party Verification

8.1 A Geoenvironmental Consultant should be present during all UST tank removals to undertake verification sampling of the excavation prior backfilling and to aid in the identification and segregation of grossly contaminated soils for off-site removal (see Steps 6.1 and 6.2).

8.2 The overall frequency of verification sampling will be dependent upon the scale of the excavations and extent of contamination.

8.3 As a minimum, sampling must comprise one sample from each pit side and two samples from the base (6 No.). Additional side-wall and base samples will be required for every 10 linear metres of excavation.

8.4 For fuel oils, the testing scope will comprise of a speciated TPH CWG, PAH and BTEX suite per sample. Tanks storing solvent shall be subject to a TPHCWG, SVOC & VOC testing suite.

8.5 Any remaining soils or imported backfill materials must comprise of clean quarried material, recycled aggregate, or other fill materials which meet the relevant generic assessment chemical criteria for the site, such as C4SLs, S4ULs, SGVs, and ATRISKsoil SSVs.

8.6 All tank removal and remedial works undertaken must be documented and submitted to the Local Authority within a Verification Report

9 Contractor Records

9.1 The contractor should maintain all records associated with the decommissioning and removal of fuel/oil tanks, and provide them to the geo-environmental consultant for inclusion into the Verification Report. As a minimum, the records should include:

i) A plan showing the location of the tank(s) encountered and removed.

ii) The approximate volume, contents and state of each tank upon inspection.

iii) Who undertook the specialist decommissioning works.

iv) Records confirming the bottoming out and inerting of tanks has taken place, along with the provision of any disposal records for the oil and contaminated water.

v) Off-site disposal records for the tank carcass and grossly contaminated soils.

Tank Removal Works: Contractor Site Guide

Discovery of a UST

- Halt works and make the area safe.
- Contact the Consultant and a decommissioning specialist.
- Inspect the UST to determine the contents, if possible.

Bottoming

- Pipework, if present, should be drained back into the tank.
- Residual fuel/oil should be pumped and removed from the tank.
- Both site records and disposal records should be kept.

Inerting

- If the tank contents are suspected to be volatile (e.g. petrol and solvents), the tank should be inerted by a specialist.
- Inerting can include cleaning and filling with gas, water, or foam.
- A record of the successful inerting process should be kept.

Removal of pipework

- Under the watching brief of the Consultant, chase out and remove all pipework.

Removal of tank and soils

- Under the watching brief of the Consultant, lift and remove the tank.
- Continue the excavation until all grossly impacted soils have been removed.

Dismantle and disposal

- The tank may be dismantled prior to disposal by cold-cutting techniques.
- The disposal records should be kept.